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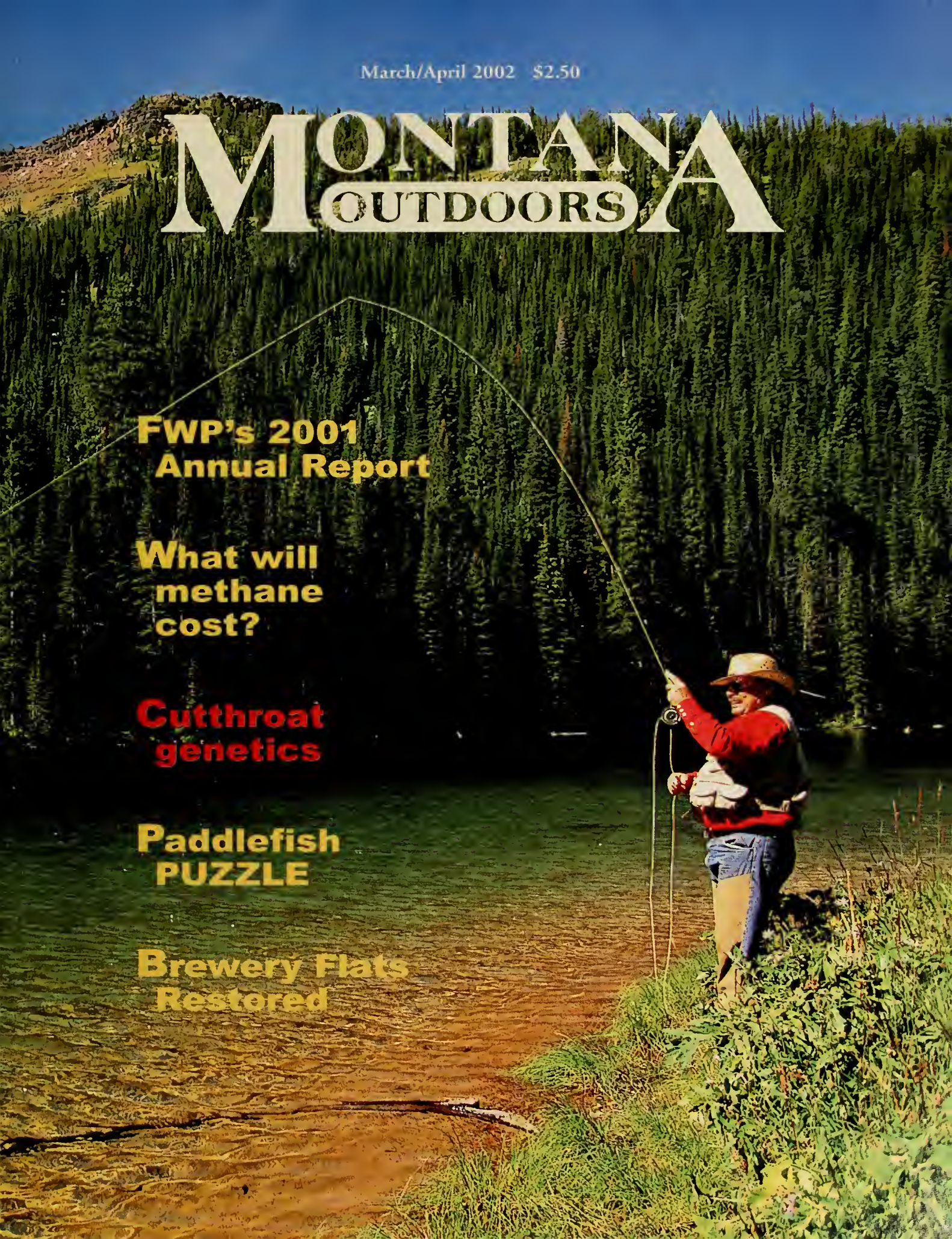
MONTANA OUTDOORS



FWP's 2001 Annual Report

What will methane cost?

Cutthroat genetics

Paddlefish PUZZLE

Brewery Flats Restored

Montana Fish, Wildlife & Parks

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Montana Fish, Wildlife & Parks

2001 Annual Report

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Rodney Schlecht

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Montanans have to make tough decisions in caring for the state's fish, wildlife, and parks. Everyone has an opinion on deer and elk quotas, wolves, grizzly bears, prairie dogs, managing recreational pressure on some of our streams, or preserving our native fish populations. Factor in how a decision will impact the resource, the surrounding environment, the economy, and public safety, and things get truly complex.

We bring our combined knowledge and passion to making these decisions that go to the core of what we care about most—our way of life. But, how do we ensure we're making the absolutely best choices? How do we balance the diverse interests and needs of Montanans, and our out-of-state visitors, with what is best for the fish, wildlife, and parks in our care? The resources at stake are too precious to settle for anything but the best we can do. I imagine the best choices may rest like trophy bulls—in the remote, hidden places. They may only show themselves after long hours of quiet listening and patient attention.

We at FWP commit we will go the extra mile to find the best choices, wherever they may rest. And we will work to continuously improve the job we do of listening to and involving you as partners in caring for Montana's fish, wildlife, and parks. That's our commitment.

We hope you'll roll up your sleeves and join us again in 2002.

M. Jeff Hagener

Montana Fish, Wildlife & Parks Director

We provide quality opportunities

John R. Ford

DenverBryan.com

Mike Barlow

Big game hunting trips can be planned online with FWP's "Interactive Hunt Planner." Hunters can select a species, obtain information on regulations, and see the hunting districts displayed on Montana's new digital highway map. Harvest statistics and quotas, special-drawing statistics, and opening and closing dates are a mouse click away. The hunt planner is free at fwp.state.mt.us.

Hunting access is available on more than 8.6 million acres of land enrolled by nearly 1,100 landowners, with more than 330,000 days of hunting annually on Block Management lands. Access Montana assists Montanans in using more than 33 million acres of legally accessible state and federal land. Together, these programs strengthen partnerships with landowners, land-management agencies, and hunters, and they increase the amount of land accessible to hunters.

The Automated Licensing System is developed and will go into service at license agents and FWP regional offices throughout the state in 2002. Once fully on line, the new system will provide all types of licenses—hunting, fishing, state lands recrearional use licenses, and Parks Passports—in one place.

New rules on the Beaverhead and Big Hole Rivers better distribute angling and floating pressure by setting specific days, river stretches, and access points for resident use, commercially guided float trips, and nonresident floating anglers. The need to manage recreational pressure on popular Montana streams is expected to continue.

Resident pheasant hunters enjoyed two additional days of hunting before the general season opened, in a move by the FWP Commission to increase upland game bird hunting opportunities for the average Montana bird hunter. The commission also capped sales of nonresident upland game bird hunting licenses at 11,000 beginning in 2002. In 2001, 6,466 nonresident upland game bird licenses were sold through December.

Montana's new bonus-point system improves the odds in FWP special drawings. Hunters who failed to draw a special big game license in 2001 were able to start collecting bonus points for a leg up on the next special moose, bighorn sheep, mountain goat, and general nonresident combination license drawings. The voluntary bonus-point system is $2 for Montana residents and $25 for nonresidents, payable only with the big game drawing application fees.

Donald M. Jones

Richard Mousel

Montana state parks & trails

The new Traveler's Rest State Park, south of Missoula near Lolo, brings the total number of Montana State Parks to 42. The site is a traditional Native American camping area and is tied to the Lewis and Clark Expedition.

The Montana State Parks Passport can now be purchased worldwide on FWP's web site at fwp.state.mt.us/parks or at discoveringmontana.com. Anyone with a credit card and current driver's license can purchase the passport, which will be mailed within five days.

ıthia Spence

Community grant programs for trails and facilities delivered more than $1.1 million through 76 grants for recreational trails, off-highway vehicle, and snowmobile trail maintenance and improvements. Montana's first State Trails Plan and Programmatic Environmental Impact Statement were adopted to guide future trails planning. More than $300,000 in Land & Water Conservation Fund grant money went to six municipalities across the state to develop or acquire outdoor recreational facilities.

The 320 Fishing Access Sites across the state mean nearly every angler has a favorite FAS. In the past two years, FWP has added six new sites and completed about $700,000 in improvements such as vault toilets, boat ramps, and stream bank protection.

Maintaining Montana's native species and habitat

Mule deer populations fared better than expected during the winter of 2000-2001, following a summer of drought. Fawn mortality was low due to a mild winter, and many mule deer populations around the state continued to rebound.

FWP's noxious weed management expenses totaled more than $350,000 on FWP lands. Landowners who participate in FWP's Block Management Program will now be eligible to receive a five percent increase in their incentive payment to use exclusively for managing weeds.

The Fork Peck Hatchery took a step forward when President George Bush signed an appropriations bill including $1.5 million for the design and engineering of this projected $20 million project. The hatchery will enable the propagation of walleye and other sport fish, as well as native and endangered species such as sauger and pallid sturgeon and other species of concern.

Montana's Wolf Management Advisory Council, a group of citizen advisors, has completed a proposed wolf management approach for public review. Their work could lead to a state management plan, required by the U. S. Fish and Wildlife Service before delisting can occur. Breeding packs of wolves number 35 or more in the Montana, Idaho, and Wyoming recovery area.

Tim Egan

Paul Updike

New conservation easements for wildlife and fish totaled more than 74,000 acres, with another 5,894 acres acquired in fee title lands. The Parks Division consolidated holdings at Ulm Pishkun State Park, acquired 327 acres near Bannack State Park, acquired mineral rights on 640 acres at Makoshika State Park, added six new Fishing Access Sites, and accepted 320 donated acres in Chouteau County.

Donald M. Jones

Future Fisheries Improvement grants totaling $478,371 were approved for 35 projects across Montana. The projects, when completed, will improve conditions for westslope cutthroat trout, bull trout, brook trout, brown trout, and rainbow trout, as well as walleye and yellow perch, bluegill, and bass.

Furbearer population management decisions rely on annual snow-track surveys, which show that pine marten and fisher populations are relatively stable and that wolverine numbers are increasing. Bobcat and lynx populations show recent increases. The lynx was listed federally as a threatened species last year, and FWP biologists will continue to document its status in the state.

John R. Ford

Montana native fish are getting a boost as FWP builds its management plan to shed more conservation light on native fish populations and habitats. To help spur interest, FWP has produced "Montana Native" bumper stickers, lapel pins, a special Fish of Montana CD, and FWP's Internet-based Bull Trout Education and Identification Program at fwp.state.mt.us under Fishing.

FWP's Enforcement Division, in a 12-month period, processed more than 4,500 violations for nearly $300,000 in bonds and fines, over $64,000 in restitution, and over 10,000 months in suspended hunting privileges. Other pending cases will increase these totals. Wardens also spent thousands of hours presenting information at Hunter Education classes and other public forums; assisting at fishing tournaments, snowmobile and boating events; and helping landowners with game damage and other issues.

Larry Javorsky

Donald M. Jones

Montana Fish, Wildlife & Parks

Mission

Montana Fish, Wildlife & Parks, through its employees and citizen commission, provides for the stewardship of the fish, wildlife, parks, and recreational resources of Montana, while contributing to the quality of life for present and future generations.

To fulfill its mission, FWP solicits feedback from Montanans and develops action plans to ensure the agency achieves meaningful results.

A citizen commission, appointed by the Governor, determines the policies and regulations that support the management and protection of the state's fish, wildlife, and parks resources in order to provide outdoor opportunities for present and future generations of Montanans.

The Montana Fish, Wildlife & Parks Commission

Dan Walker, commission chairman, from Billings, is a retired executive from US West Communications. (Term expires Jan. 1, 2005)

Timothy J. Mulligan, commission vice-chairman, is owner of the Corner Store Conoco in Whitehall and is involved in his family's homestead ranch in Cardwell. (Term expires Jan. 1, 2003)

Darlyne Dascher is a partner in a ranch operation south of Fort Peck and works as the local brand inspector. (Term expires Jan. 1, 2003)

John Lane of Cascade operares a portion of the family ranch and is a member of the Devil's Kitchen Management Team, which works with FWP in managing wildlife resources in the area. (Term expires Jan. 1, 2005)

Michael Murphy, a Wolf Creek rancher, has been executive director of the Montana Water Resources Association since 1993. (Term expires Jan. 1, 2005)

Emphasizing communication

FWP's Centennial celebrated the state's conservation legacy, acknowledging the previous 100 years of conscious decisions and difficult personal sacrifices on the part of Montanans to conserve what is best about this state. Renowned western artist Larry Zabel created "Sun River Challenge," an original oil painting that commemorates the 1947 creation of the Sun River Game Range. FWP published a special edition of *Montana Outdoors* magazine, produced an award-winning documentary film, *"No Need for a Saturday Night,"* and celebrated in other ways around the state.

Black and grizzly bear identification skills will be tested before hunters can obtain a black bear license under a new mandatory bear identification program. The intent is to save grizzlies and Montana's black bear season. The training and test are available by mail at FWP regional offices, the Helena headquarters office or on line at fwp.state.mt.us.

Dale C. Spartas

Mike Barlow

DusanSmetana.com

The Remedial Hunter Education program, authorized by the 2001 Legislature, is the only way for individuals who have had their hunting privileges suspended to regain those privileges. Designed to strengthen hunter ethics and awareness, the program is available by mail or at fwp.state.mt.us at the Hunter Education icon.

Construction of the Montana Wildlife Rehabilitation and Education Center is underway, while fundraising for the $800,000 project continues. Later phases may include additional interpretation and education facilities. Montana Fish, Wildlife & Parks, the Montana Fish, Wildlife & Parks Foundation, the Mikal Kellner Foundation for Animals, and the U.S. Forest Service are partners in building the facility.

The Hooked On Fishing Not On Drugs program now includes 109 classrooms, and this year 36,000 Montanans enjoyed fishing clinics, special events, and school-related aquatic education programs. Montana Watercourse-Project WET, Federation of Fly Fishers, school districts, and teachers partnered with FWP to generate funds to match the nearly $300,000 in federal funding that FWP's aquatic education programs attract.

Montana Fish, Wildlife & Parks

The Parks Division is responsible for development, maintenance, and operation of all state parks and affiliated sites in order to provide diverse recreational opportunities while preserving important historical and cultural resources within Montana.

The Wildlife Division is responsible for managing all species of Montana wildlife including big game, threatened and endangered species, upland game birds and non-game birds, and waterfowl.

The Fisheries Division is responsible for the management and perpetuation of Montana's fish and other aquatic resources and the habitats they depend on.

The Conservation Education Division prepares and distributes information on FWP activities and news items to the media and conducts a variety of educational and recreation-safety programs.

The Enforcement Division is responsible for enforcing the laws of Montana, FWP rules, and FWP Commission regulations related to fish, wildlife, and parks. Division personnel also enforce state boating and snowmobile rules and laws related to private property.

The Field Services Division is responsible for FWP's lands program and construction projects, as well as its Block Management (public hunting access) and landowner-hunter relations programs.

The Director's Office staff makes policy and administrative decisions. Regional supervisors manage on-the-ground implementation of policies and programs. The Administration and Finance Division is responsible for budgeting, accounting, purchasing, human resources, data processing, and administration of FWP's licensing functions.

2002 Revenue sources

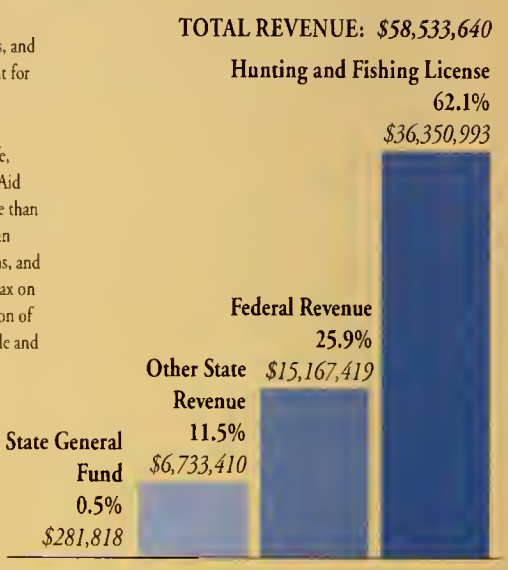
FWP is funded primarily by user fees. Funding sources include:

HUNTING AND FISHING LICENSES
This includes all license sales revenue, interest earnings, and other miscellaneous revenue. Nonresident sales account for more than two-thirds of FWP's total license revenue.

FEDERAL REVENUE
FWP receives a variety of federal funds for fish, wildlife, and parks activities, including funds from the Federal Aid in Sport Fish and Wildlife Restoration programs. More than $11 million apportioned to Montana is derived from an excise tax on sporting arms and ammunition, handguns, and certain archery equipment—as well as from an excise tax on fishing equipment and electric trolling motors, a portion of the federal-fuels tax, and import duties on fishing tackle and pleasure boats.

OTHER STATE REVENUE
Other state revenue sources include: State Parks fees; a portion of the state's lodging facilities tax; a small percentage of the state fuels tax; interest earnings from coal severance tax receipts; and other revenue sources.

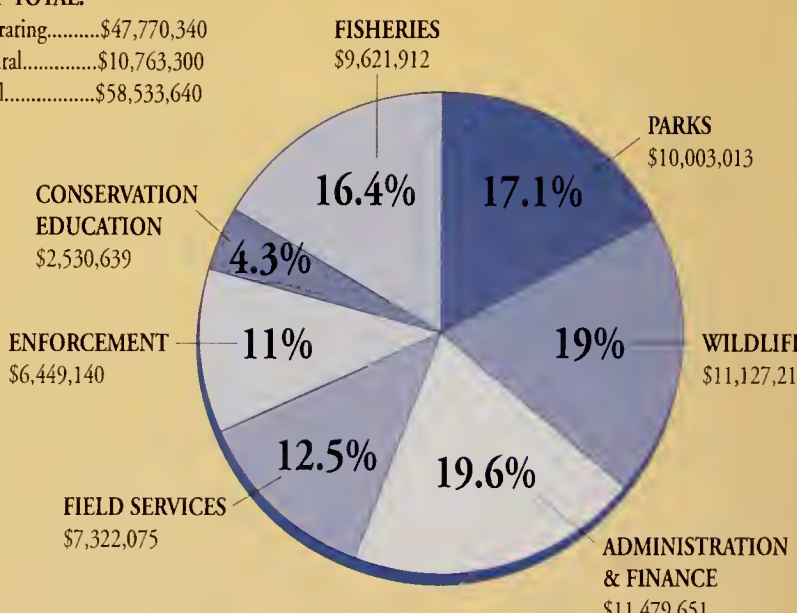
STATE GENERAL FUND
Less than one percent of FWP's total budget comes from the state general fund. Nearly all of this funding goes to the Parks Division.



The revenue sources here illustrate how FWP expenditures are funded.
Actual annual revenues may fall above or below the revenues in this illustration.

2002 Planned expenditures

FWP TOTAL:
Operating.....$47,770,340
Capital.....$10,763,300
Total.....$58,533,640



FWP SPENDS ITS MONEY TWO WAYS:
Operations for day-to-day management of fish, wildlife, and parks resources.
Capital to make major repairs and maintain FWP properties, to renovate and build facilities, and to protect and enhance critical habitats.

Dave Books
The next lesson

By Bruce Auchly and Tom Palmer

THE TEACHERS WE REMEMBER MOST fondly made learning fun. Their teaching seemed effortless, studying was almost enjoyable, and we looked forward to the next lesson.

So it was with Dave Books. After 140 bimonthly deadlines, after 24 years, after countless hours rewriting and searching for just the right word, Books retired December 31 as editor of this magazine. He taught us about Montana's outdoors through *Montana Outdoors.*

"He is a friend of Montana and all we stand for and all that is special to us," says Ron Aasheim, head of FWP's Conservation Education Division and Books's boss and friend. "We are lucky to have had Dave at the magazine."

Always self-effacing, Books says he simply sought a balanced message: "People like hunting and fishing and camping, because they are fun things to do. We wanted to provide them with information to learn, to enjoy."

Learn and enjoy. Teaching conservation to people who just want to have fun. Books made the lessons stick, Aasheim says, because he took part in the subject matter: "He was a participant. He camped, hunted, fished."

To Books, success came with how the message was delivered.

"We wanted to give readers the information to let them know what was going on in Montana," he says, "and then let them do what they needed to do to let their voices be heard on how our resources should be managed."

Since 1978, when Books took over as editor, the magazine's circulation has grown 35 percent from 30,000 to over 40,000. That increase came after some charged times in Montana. Topics during the 1970s such as subdivision development, strip mining, and dam building polarized conversations even between friends. Battles were fought

Dave Books with Jenny: "I hope it's been fun and educational for the readers."

over natural resource development in many areas, and careers were wrecked along the way.

"From the time Dave took over *Montana Outdoors*," Aasheim says, "he was able to provide balance on issues in the magazine. He was the perfect fit: intelligent, a good editor, and a good writer—and our staff and writers liked and respected him."

During his tenure, Books not only increased circulation, he started several *Montana Outdoors* trademarks, such as the annual photo issue. "I think people relate really well to the photographs and the beauty of the state," he says.

Books also devised the department's seven widely distributed identification guides—on big game, fish, furbearers, upland birds, birds of prey, owls, and amphibians—first published in *Montana Outdoors.*

And Books got it all done with a mild and mellow manner.

Under that nice guy persona, however, burns a fierce competitive spirit. Joe Elliott went to high school with Dave in Eau Claire, Wisconsin, and has remained a good friend since moving to Montana in 1965.

"He's incredibly competitive," says Elliott. "He has trophies in handball, shooting, golf."

Of Books's many activities, perhaps bird hunting best portrays the drive within that body, as lean and tough as a willow sprout.

"You rarely go out and shoot more birds than Dave does," Elliot says. "And if you shoot your limit of pheasants by 10 a.m., he will stay out until dark to make sure he gets his."

That commitment afield came through in each issue. "*Montana Outdoors* was consistently recognized for excellence by the Association of Conservation Information," says Aasheim, "and at a time when we had one of the smallest magazine staffs among state agencies."

Like sunlight through a magnifying glass, *Montana Outdoors* became the instrument that focused Books's competitive drive and interest in all things outdoors. Pick up any issue since May 1978. It's all there.

"We wanted to cover the important conservation issues," Books says, "but do it as fairly and factually as we could. We wanted to keep people informed about what the department was doing to solve problems."

"My only regret is he didn't have time to write more for *Montana Outdoors*," Aasheim says. "He's an outstanding writer."

That may happen in Books's next career: retirement. Besides the inevitable—more fishing, hunting, and golfing—Books plans on freelance writing and editing on the side.

"I think I'll just kind of relax," he says. "I really haven't ever had an extended time away. It will be nice to not have to worry about deadlines."

Adds Books, who always kept the magazine's subscribers foremost in mind: "I hope it's been fun and educational for the readers."

Class dismissed. ■

Bruce Auchly is an FWP regional information officer based in Great Falls. Tom Palmer is chief of FWP's Information Bureau.

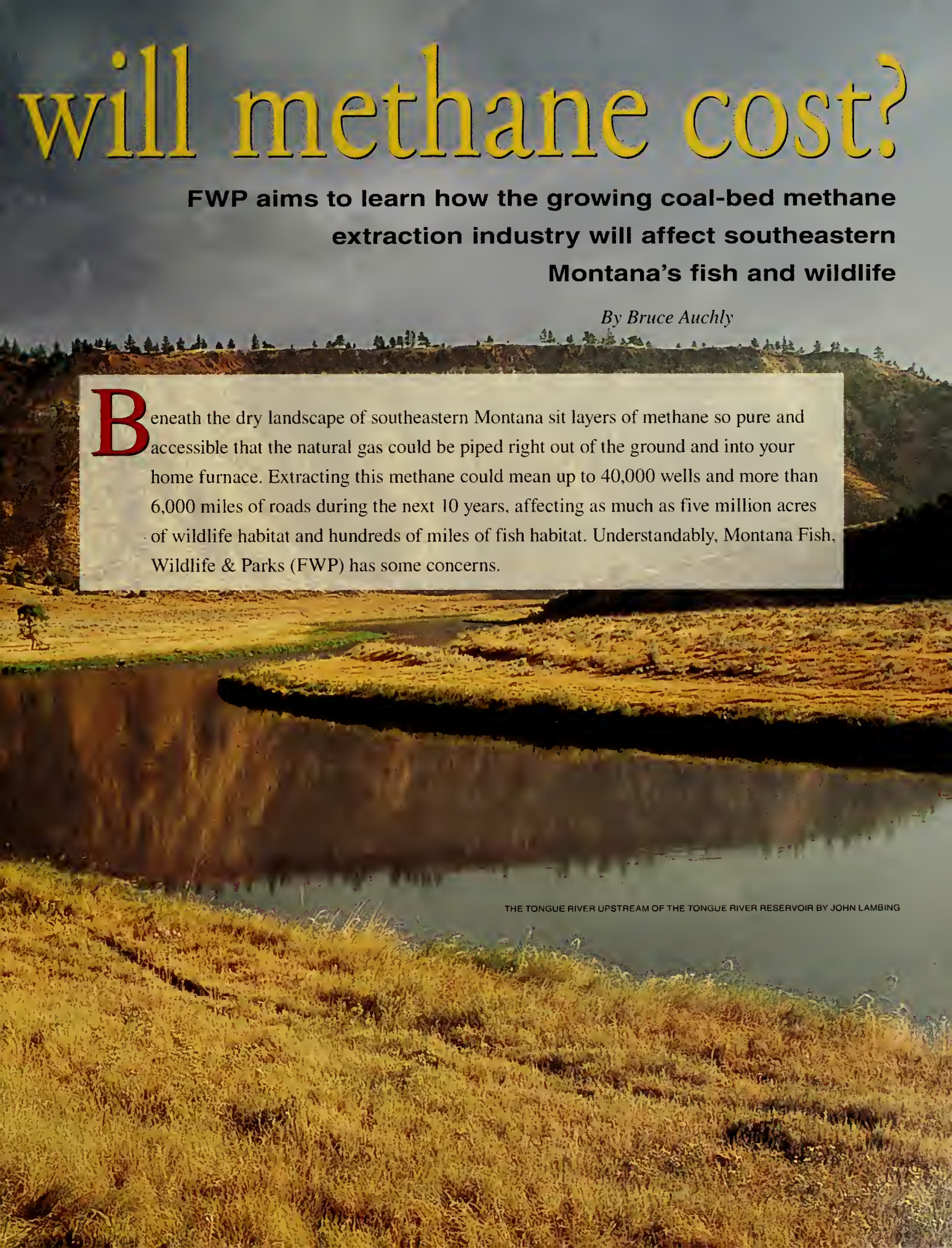
What

will methane cost?

FWP aims to learn how the growing coal-bed methane extraction industry will affect southeastern Montana's fish and wildlife

By Bruce Auchly

Beneath the dry landscape of southeastern Montana sit layers of methane so pure and accessible that the natural gas could be piped right out of the ground and into your home furnace. Extracting this methane could mean up to 40,000 wells and more than 6,000 miles of roads during the next 10 years, affecting as much as five million acres of wildlife habitat and hundreds of miles of fish habitat. Understandably, Montana Fish, Wildlife & Parks (FWP) has some concerns.



THE TONGUE RIVER UPSTREAM OF THE TONGUE RIVER RESERVOIR BY JOHN LAMBING

The agency has come out in favor of a go-slow approach to new coal-bed methane development to safeguard the wildlife, aquatic, and recreational resources of the state.

"From FWP's perspective, a phased-in approach is critical to a well-balanced, sustainable approach to coal-bed methane development," says FWP director Jeff Hagener.

The gas industry wants to proceed at a faster pace, while working to create a "minimum impact," an industry executive says.

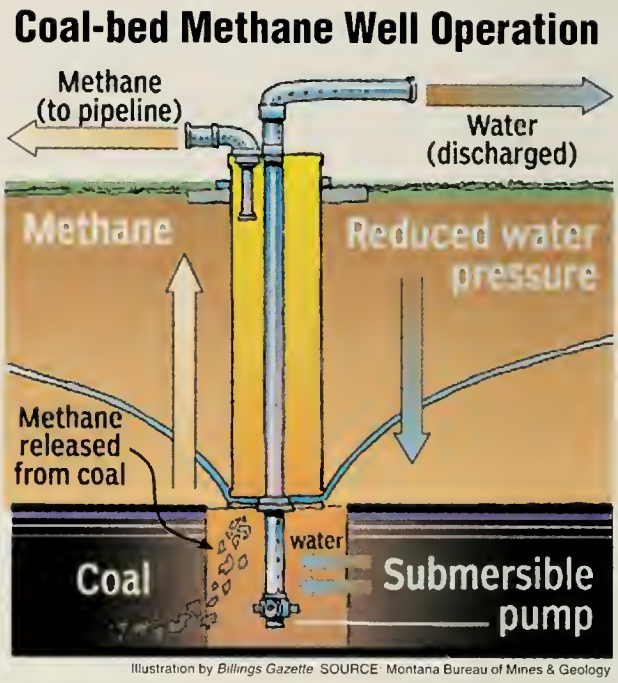
"The last thing we want to do is damage the environment," says G. Bruce Williams, vice-president of Fidelity Exploration and Production Company. "We live here. We hunt. We fish."

Part of the growing concern over coal-bed methane extraction centers on the large aquifers that hold methane in underground coal seams. Getting methane to the surface requires pumping millions of gallons of often saline water, separating methane from the water, and then piping the methane to market. Irrigators along the Tongue and Powder rivers are worried about the salinity of the water that must be pumped out. Ranchers who don't own the mineral rights under their land dread the disruption that gas wells and pipelines may bring to their operations.

FWP has its own apprehensions. "We're concerned about water quantity, water quality, and surface disturbance impacts on terrestrial wildlife," says Don Skaar, FWP water pollution biologist.

As FWP's point man, Skaar translates the arcane language of water chemistry for department policymakers. Skaar is in FWP's Fisheries Division; staff from the Parks, Wildlife, and Enforcement divisions also are voicing their concerns in interagency meetings.

Drilling for minerals under federal control, whether on private or public land, requires a federal Bureau of Land Management (BLM) permit. The BLM controls roughly 50 percent of the mineral rights in southeastern Montana. Gas wells where the minerals are privately held or state owned require the approval of the state Board of Oil and Gas Conservation. Permits to discharge ground water come from the state Department of Environmental Quality (DEQ). FWP is an advisory, not a permitting, agency.



Like opening a can of soda pop, a coal-bed methane well releases methane trapped in coal seams by pressure from underground water. The water-gas mixture rises to the surface, where the gas is piped to a compressor station and the water is discharged either onto land or into a river.

Up to 40,000 wells

Enough methane lies beneath the coulees and ridges of southeastern Montana to support between 14,000 and 40,000 wells over the next 10 years, according to BLM estimates. Those wells would mean 6,680 miles of roads and 20,697 miles of utility corridors, affecting wildlife on 880,000 to 4.7 million acres.

"You can't develop natural resources without some impact," Williams says, adding, "but the impact can be minimized."

Currently, Fidelity is the lone methane gas company operating in Montana. The Denver, Colorado–based company operates 233 wells in Montana, all on private land. A lawsuit has put a moratorium on developing any new wells until BLM and state officials finish an environmental impact statement, due for completion this summer.

Pulling methane from underground is relatively simple. First, a water well is drilled into an underground coal seam. (Most of the methane is within the coal, held there by water pressure.) Next, the water is pumped out. Removing the water pressure allows the gas to travel through fractures in the coal seam and migrate up the well casing.

Each Fidelity well, on average, pumps out 15 gallons of water a minute when new, Williams says. After a year, the average output drops to nine gallons a minute, and those wells approaching two years old pump seven gallons a minute. By way of comparison, water comes out of a garden hose at a house in Great Falls at five to 10 gallons a minute.

Fidelity's current 233 wells are pumping a total of roughly 1,600 gallons of water a minute, Williams says. That's 96,000 gallons every hour, or more than two million gallons each day. The city of Great Falls uses five million gallons of water on a typical winter day.

Most of Fidelity's coal-bed methane well water, approximately 1,300 gallons per minute, goes directly into the Tongue River. Fidelity has 13 authorized discharge points over a two-mile section of the river, Williams says. The remaining water goes to a private ranch for livestock and is sprayed on roads to reduce dust.

Bruce Auchly, an FWP regional information officer based in Great Falls, is a frequent contributor to Montana Outdoors.

Methane makes up about 31 percent of the energy produced in the United States, according to federal Department of Energy figures. It's the predominate type of natural gas (the others are propane and butane) and an important part of the federal government's energy package. Because of how methane was formed, the country's biggest supplies are in its coal-producing regions: Appalachia, the Midwest, and the West.

In prehistoric times, plants lived, died, and decomposed, eventually turning into coal. A byproduct of rotting plants, methane gas became trapped underground, bound by the pressure of aquifers. The Powder River Basin, a geological formation beneath southeastern Montana and northeastern Wyoming, contains an estimated 30 to 35 trillion cubic feet of methane. That's enough natural gas to meet the needs of the United States for roughly one year. Most of the Powder River Basin gas lies underneath Wyoming, which has seen about 9,000 wells drilled in the last three years, according to the *Billings Gazette*.

Go slow, and cluster wells

After witnessing the coal-bed methane boom in Wyoming, FWP decided to advocate a phased-in approach to development in Montana.

"That would mean lease and permit 20 to 35 percent of the potential lands and cluster the gas wells," says department director Hagener. "Phased-in development would provide an opportunity to monitor the development and production of coal-bed methane and assess the effects on natural and cultural resources."

The agency supports a gradual approach, Hagener says, because its biologists don't have baseline information to determine future effects of the development. "We don't know the impacts of full-field development on fish and wildlife populations," he says. "And we're not going to know until after the development is actually underway."

Depending on the details of FWP's phased-in development proposal, gas companies may or may not support it. "Coal-bed methane will be phased in," Williams says. "The industry has predicted that, if all went well, there would be 10,000 wells in 10 years. So if you mean, by phased in, 10,000 wells over 40 years, then industry is not in favor of that."

One reason FWP favors the go-slow approach stems from concern over southeastern Montana's fisheries, particularly the Tongue River.

The Tongue is a classic prairie stream, alternately cutting through canyons then widening to create rich bottomlands, sheltered by a ribbon of cottonwoods. It starts in Wyoming's Bighorn Mountains and then, from the Montana border, flows 207 miles north to the Yellowstone River at Miles City. The river's first stop in Montana is the Tongue River Reservoir.

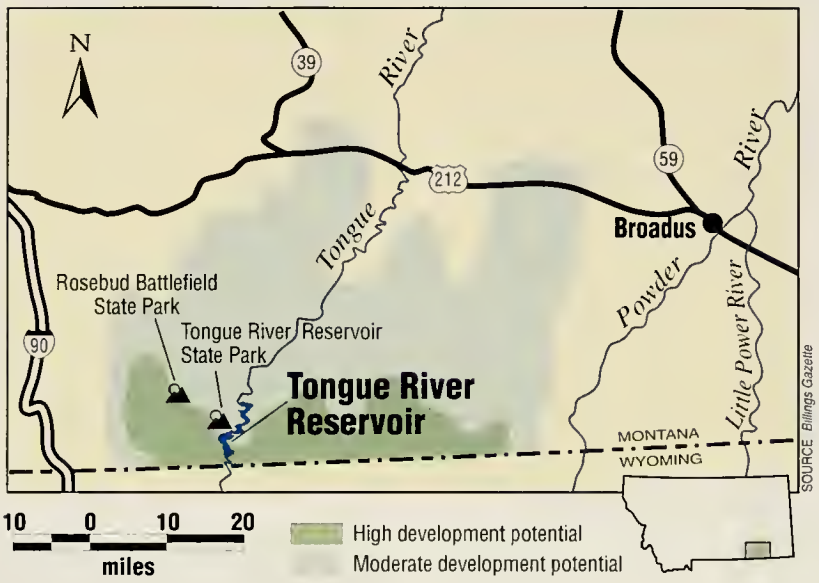
"The fishery in the reservoir is phenomenal," says Brad Schmitz, regional fisheries manager in Miles City. "It's the biggest crappie fishery we have in the state. Also, the smallmouth bass fishery is very productive and our walleye is good, too. But it's the crappie that draws people."

CHRIS MADSON/WYOMING WILDLIFE

CODY BEERS/WYOMING WILDLIFE

Methane's big footprint: The biggest concern of FWP wildlife officials is not the wells themselves but the accompanying development. Large compressor stations (left), which collect gas from several wells, can produce a constant roar. New roads to wells (above) fragment wildlife habitat, while additional power lines provide perches for raptors that prey on sage grouse and other small wildlife.

Potential Coal-bed Methane Sites



On a summer holiday weekend the eight-mile-long reservoir can draw 5,000 to 6,000 people, Schmitz says.

Water from Fidelity's methane wells is pumped into the Tongue upstream of the reservoir. Because the reservoir has a long retention time—it takes 36 days to change its volume—the potential exists for the extracted saline water to hurt aquatic life. "It will increase the concentration of salts in the reservoir," FWP water pollution biologist Skaar says.

Most people think of salt as table salt, or sodium chloride. Water salinity, however, is measured by total dissolved solids, including several other different "salty" compounds, such as potassium chloride, sodium sulfate, and sodium bicarbonate. Normally, potassium chloride is barely present and not a factor. Eastern Montana surface water typically contains sodium sulfate, which fish can tolerate in high levels. But underground water held in coal seams usually is also high in sodium bicarbonate, commonly known as baking soda. Although biologists know that fish cannot tolerate much sodium bicarbonate, they don't know exactly how much sodium bicarb is too much for fish when the compound gets mixed with surface water.

"There are no water quality standards for these salts," Skaar says.

Using the scant science available, Skaar has proposed setting effects thresholds. That means if the amount of aquifer water pumped into the Tongue causes the river water to exceed those thresholds, then the aquifer water should be treated first to remove the chemical compounds.

The other water quality issue is sodium absorption rate (SAR). The SAR is the relative amount of sodium in water compared to the amount of calcium and magnesium. Too much sodium can degrade soil quality and hinder the ability of vegetation to take up moisture and nutrients from soil. SAR is used to determine water quality for irrigation water. Montana's Department of Environmental Quality, not FWP, has taken the lead on this issue.

More humans

Water isn't FWP's only concern. A Montana methane gas boom will mean new people in a new place, and that could lead to new problems. It has in Wyoming. Though the jobs bring much-needed money and tax revenue to rural areas, they also attract workers sometimes tempted by abundant wildlife and few enforcement officers. Newcomers to southeastern Montana will find a game-rich area, and game wardens will likely find themselves very busy.

"Concerns? Absolutely," says Bryce Christensen, FWP Region 7 game warden captain. "There's the chance of overusing the resource, residency problems, trespass. Anytime you get guys on summer projects, you can get problems."

Some fear that poaching could represent an indirect result of methane gas development on wildlife. Direct effects will come from exploration, wells, and roads—collectively known to natural resources managers as surface disturbance.

"Our biggest concerns are habitat fragmentation and increased human

Many compressor stations are near sage grouse mating grounds. Biologists contend that the station engines drown out the booming sound that male sage grouse make to attract females.

CRAIG & LIZ LARCOM

activity," says John Ensign, FWP regional wildlife manager in Miles City. "Primarily [as it affects] sage grouse, then mule deer and antelope."

Habitat fragmentation means breaking up areas where wildlife live into smaller pieces that are often uninhabitable, or so far from other habitat that animals have difficulty moving back and forth.

Human activity can disrupt sage grouse when they gather for breeding on their spring breeding grounds, or drive deer and antelope off their winter range and into areas with less food and shelter. "Deer and antelope tend to congregate," Ensign says. "Human activity could push the animals out of those areas."

FWP wildlife biologists are particularly concerned about potential harm to the state's sage grouse populations. Though Montana has abundant sage grouse, states with few birds may put the species on the federal endangered species list. As a result, FWP biologists have had to increase efforts to count sage grouse when the birds court in spring to better verify the state's healthy grouse populations.

Human disturbance can cause sage grouse to abandon their mating grounds, called leks. How much human disturbance is too much? It's all a matter of timing and location. FWP biologists recommend at least a quarter-mile between leks and any roads, wells, or compressor stations (places where the gas from two dozen wells is collected and compressed into pipelines). Also, they recommend that humans stay away from leks from 4 a.m. until mid-morning and from about 7 p.m. until after dark.

Although the wells themselves don't necessarily affect wildlife, overhead power lines and compressor stations are problems. Power lines next to a lek can provide a perch for raptors—not unlike a bunch of hungry kids lined up outside a fast food joint.

Far louder than a sage grouse can boom

And compressor stations make noise—lots of noise. A compressor close to a lek will drown out the mating sound of male sage grouse. In spring, male sage grouse prance about on their leks and produce a booming sound with internal air sacs, advertising for mates. Female birds hear the booming and come running—but not if they can't hear the males over the compressor.

With the exception of sage grouse numbers and lek locations, baseline data on wildlife in the area remains scarce. If a gas company calls FWP wanting to know where to avoid deer habitat in a certain township, biologists likely won't be able to provide much information. Even less is known about many nongame species, such as golden eagles, burrowing owls, leopard frogs, and prairie dogs.

"Our knowledge is pretty patchy," Ensign says. "This is a big area, and we're not geared up for it."

One FWP proposal would have the gas industry fund additional studies and people. "The industry should be responsible for some of the costs that FWP will incur as a result of coal-bed methane development," says Hagener.

Specifically, Hagener says, that would mean boosting enforcement to deal with increased human use in the area, making improvements to and adding staff at Tongue River Reservoir, and hiring two full-time biologists (one fisheries and one wildlife) to evaluate the effects of phased-in development.

Williams of Fidelity says the proposal could have merit: "If there's a direct relationship, we would look at that. Industry could fund specific studies, do baseline data collection in conjunction with the agencies."

FWP's mission is to provide for the stewardship of Montana's fish, wildlife, parks, and recreational resources, while contributing to the quality of life for present and future generations. Coal-bed methane is a good test of that stewardship, representing the challenge of balancing society's energy needs against its needs for healthy wildlife and recreational treasures.

It's easy to calculate a company's net worth, a paycheck, or a monthly heating bill. It's not so simple to put a price on fishing the Tongue River or watching male sage grouse compete on a spring lek. But FWP must translate those intangibles into cold equations in order to fulfill its mission. ■

TIM EGAN

Every minute, 1,300 gallons of water pumped from coal-bed methane wells is discharged into the Tongue River upstream of the Tongue River Reservoir. Attracting up to 6,000 anglers on a busy summer weekend, the reservoir's healthy crappie fishery could be at risk from sodium bicarbonate and other compounds discharged from the wells.

Can hatcheries help conserve the westslope cutthroat?

Yes, say fisheries biologists, but the big question is where and how

By John Fraley

Westslope cutthroat trout have lived in post-glacial western Montana for thousands of years. During that entire time, the species has been able to survive catastrophic fires, massive floods, and severe droughts. But in the less than 200 years since Meriwether Lewis first described the subspecies, the cutthroat's range has dwindled. The population decline is due to stream siltation, dams, overfishing, and competition from—and hybridization with—introduced nonnative fish such as brook trout.

Habitat protection and restoration are important components of a westslope cutthroat recovery program. But is there a role for state hatcheries in the restoration and conservation of westslope cutthroat? Historically, Montana Fish, Wildlife & Parks (FWP) trout hatcheries were primarily used to produce large numbers of fish that were then stocked wherever possible. But in recent years, trout hatcheries have increasingly become the source of fish used in restoration work. FWP has committed itself to conserving native westslope cutthroat, and biologists are now discussing when and where to use hatcheries and hatchery-reared cutthroat as part of that effort.

The first brood fish

Despite its name, the westslope cutthroat is native to both sides of the Continental Divide. A cutthroat subspecies also found in Idaho, Washington, Oregon, and western Canada, the westslope lives in Montana's Kootenai, Flathead, and Clark Fork watersheds and in the headwaters of the Missouri and Saskatchewan rivers. The populations in greatest danger of disappearing are those east of the divide, where they are today confined mainly to headwater reaches.

Efforts to increase numbers of this native species, especially in mountain lakes, began in 1952 when FWP first established a westslope cutthroat hatchery brood stock. (Brood stock are the fish held in a hatchery to produce eggs and young fish that are reared and then stocked.) That winter, three FWP employees flew into Big Prairie airfield in the Bob Marshall Wilderness. From there, they snowshoed to Big Salmon Lake, a remote lake known for indigenous westslope cutthroat trout that biologists believed would make an excellent basis for the department's first cutthroat brood stock. Over several days, they caught 32 cutthroat trout through the ice with hook and line. These fish, flown out and held in the Jocko River Hatchery in Arlee, formed FWP's initial brood stock.

Throughout much of the next three decades, young trout reared from these and later generations of brood stock were stocked in lakes and streams. Then, in 1977, geneticists detected a serious loss of genetic diversity in the brood stock. By 1983, outward signs of problems were emerging, such as low egg hatching success and fin deformities in many of the fish.

Building a more diverse stock

Hatchery managers took this opportunity to start over and form a new, genetically diverse westslope cutthroat brood stock that would survive and reproduce in a variety of habitats. The present stock used by FWP (referred to as the westslope stock) was founded in 1983 when FWP biologist Joe Huston and his crews collected 6,445 westslope cutthroat from 12 Hungry Horse Reservoir tributaries and two Clark Fork tributaries. Pathologists tested the fish from each of these 14 creeks and found them to be disease-free and genetically pure. The fish were then cross-bred to combine the various gene pools and create brood stock containing genes from all 14 unique strains.

Huston says that a diversity of creeks was chosen to ensure that the various life forms of cutthroat trout—those that lived their entire lives in streams, called residents, and those that migrated from rivers and lakes to spawn in tributaries—would be included in the new brood stock. The Clark Fork tributaries were included to ensure that resident fish would be part of the mix.

Wild or hatchery trout?
Improvements in hatchery science are allowing managers to produce cutthroats with ever-increasing genetic diversity and fitness.

LARRY JAVORSKY

Managers moved the wild fish to holding facilities at Murray Springs State Fish Hatchery near Eureka. Later the stock was transferred to FWP's Washoe Park Hatchery at Anaconda, where water temperature can be varied to increase spawning success for this subspecies.

The westslope stock grows well and maintains excellent condition in lakes ranging from potholes at 3,000 feet elevation to the highest lake (8,000 feet) that supports fish in northwest Montana. In that region alone, 125 mountain lakes maintain popular sport fisheries due to periodic planting of the westslope stock. Many valley floor lakes benefit as well.

"The westslope stock has been a phenomenal producer for us," says Gary Bertellotti, FWP hatchery chief. "But, like anything else, these fish are not ideal for all situations. They work well in small to medium lake systems, and they are especially good in high mountain lakes to maintain a sport fishery.

"Anyone who thinks of modern hatchery stocks as inferior," Bertellotti adds, " is thinking ancient history."

Appropriate for at-risk populations?

Though few question the success of the westslope stock to improve recreational fishing in lakes, these fish usually aren't considered for stocking in streams (or in lakes that have outlet streams) where small, unique populations of westslope cutthroat are in danger of disappearing. The hatchery fish could interbreed with wild fish in nearby waters and thus compromise the genetic uniqueness of cutthroat populations downstream of areas where the hatchery fish are planted.

Biologists generally believe it is better, when possible, to restore dwindling cutthroat populations using unique cutthroat stocks that have a genetic makeup similar to that of the population being restored. This "nearest neighbor" concept holds that cutthroats from a nearby stream are a better source for genetically specific cutthroat than are FWP's westslope hatchery stock.

Robb Leary, a University of Montana fish genetics expert who has studied cutthroat genetics for nearly two decades, works closely with FWP staff. He agrees that the westslope stock has a role in westslope conservation and restoration. But because that mixed-origin stock is more genetically diverse than the average westslope cutthroat population, it may have limitations for any restoration program where the paramount goal is to maintain the original genetics of a specific cutthroat population.

"Essentially, these fish are mutts," Leary says. "For management situations, that may be good. But I'd avoid using them where they have a chance to interbreed with existing native cutthroat."

In a situation where westslope cutthroat stocks are needed for recovery, Leary and FWP biologists say it's best to use fish from the closest possible source geographically. If that's not possible, they maintain, using the westslope stock is still better than stocking fish other than cutthroat, such as rainbow trout.

Leary says that there are large genetic differences among populations of westslope cutthroat, which probably indicate a lack of interbreeding among these many small populations. And that, he says, may give each population important local adaptations. Each may be better adapted to its particular stream than the more genetically diverse westslope stock would be, although this has not been documented.

Leary and many other fisheries scientists contend that keeping particular strains of cutthroat as unique and distinct as possible may, in some cases, allow the subspecies to survive better in the long run.

Bertellotti agrees, but he adds that the westslope hatchery stock should not be discounted entirely for its potential for future restoration on some streams where other techniques aren't feasible. He notes that the hatchery stock could actually provide more of the genetic fitness that dwindling strains may need to survive. What's more, Bertellotti says, hatchery managers continue to improve the westslope stocks by mixing in wild fish from genetically pure populations.

"With new research and careful hatchery practices, we can produce an excellent native fish in terms of genetics and performance," he says.

DAVE OWEN

John Fraley, an FWP information officer based in Kalispell, is a frequent contributor to Montana Outdoors.

Though FWP isn't currently using the hatchery stock for westslope restoration, it remains a tool that fisheries managers can use if other options aren't possible. Bertellotti points out that because of the westslope stock's genetic diversity—finding its origin in more than a dozen pure populations that were then mixed together in the hatchery—it could actually introduce genetic resilience into diminished populations.

Importance of genetic diversity

Hatchery managers aren't the only ones touting the westslope stock's potential for restoration. "This is a genetically variable stock that performs in a variety of environmental conditions," says Bob Snyder, FWP native fish coordinator. "We don't know which genes may impart resistance to drought or impart successful spawning. We don't have the cutthroat genome mapped, and that's why these fish are so important. We can introduce a diverse stock and let nature sort it out."

In fact, genetic inbreeding may have made isolated westslope cutthroat populations more susceptible to environmental threats than the genetically diverse brood stock would be. Geneticists have found that westslope cutthroats from the same stream are nearly genetically identical. Yet those same fish have a far different genetic makeup from that of other westslope cutthroat populations living in different streams, even those within the same drainage.

What accounts for the wide genetic differences among various westslope cutthroat populations? According to Snyder, some scientists theorize that it may be due in part to the species' harsh environment, which historically has forced many streams' populations to reestablish themselves with a small number of individual fish, leading to a narrowing of the genetic makeup of the trout in that stream.

For example, if an environmental event such as a drought had killed most cutthroat trout in a stream, then the population would have rebuilt itself by the breeding of just a few surviving individual fish. This phenomenon, known as a population bottleneck, results in inbreeding, a loss of genetic variation, and increased genetic similarity of individual trout.

Long before these changes occurred, says Snyder, all the various cutthroat populations likely came from a more genetically diverse founding population.

Interestingly, FWP's westslope hatchery stock—which combines genes from fish of many streams—may be more similar to the westslope cutthroat's original population than the many different unique strains in streams now.

Genetics issues aside, FWP currently lacks hatchery space to rear dozens of unique cutthroat stocks while maintaining adequate numbers of existing westslope stock. That means citizens

JOHN FRALEY

In 1952, FWP took its first westslope cutthroat brood stock from remote Big Salmon Lake (left), which was known for its healthy indigenous westslope cutthroat. Today, westslope cutthroat are stocked primarily in backcountry lakes (right), where they provide excellent recreation and can't mix with remaining pure strains of cutthroat.

DONALD M. JONES

PAUL UPDIKE

Due to past clearcutting (left), dams, overfishing, and competition from nonnative fish, westslope cutthroat numbers have dwindled significantly from the species' historic range. Though most remaining original populations are restricted to small streams (above), FWP is working to restore populations where feasible.

and FWP will need to make some hard choices regarding the future of the state's hatchery brood stock program.

"Do we want a sport fishery for this native fish and a genetic reserve for a diverse cutthroat stock?" asks Bertellotti. "If so, then the current westslope cutthroat stock is great for both those purposes. Or do we want specific stocks for recovering specific streams? We can't have a large program for both types of stocks."

Keep all the parts

In 1994, due to concern over cutthroat recovery, FWP formed an interagency cutthroat technical committee to examine the issue. The committee recommended that managers strive to preserve each existing population of westslope cutthroat trout whenever possible, while acknowledging that this could be difficult in some situations.

"Managers should be conservative and assume each population should be retained," says the University of Montana's Leary, a committee member.

This approach is consistent with a westslope cutthroat conservation agreement among FWP and other agencies.

Building a better cutthroat

For 15 years Mark Sweeney, FWP fish culturist, has worked to improve the quality and genetic vigor of westslope cutthroat trout at the Washoe Park Hatchery. Basic to this effort are two water sources: One is a 45-degree well; the other is a deep artesian spring that runs 56 degrees year-round. Sweeney varies the water temperature in the hatchery throughout the year to mimic natural water temperature changes and to spur egg development and fat accumulation in the four-year-old females that produce the best eggs. Female westslope cutthroat trout are then spawned randomly with randomly selected three-year-old males to reduce the likelihood of sibling crosses, which can result in inbreeding problems.

Another method used to ensure strong genetic crosses involves extending the period during which managers collect spawn from the fish. The spawning period runs from early May through June to encourage a range of spawning timing. Also, a large number of fish (including 800–1,200 females) are used in the process. Young fish are selected from each of these crosses to produce genetically diverse fish for future brood stock.

Managers examine the physical characteristics of individual fish each year for any signs of inbreeding. Sweeney says that the westslope stock will be improved further in coming years with the introduction of wild fish genes.

"It's been an excellent-performing fish, and it's healthy, with few disease problems," he says. "It's a great fish that's only going to get better as we follow our plan to add more wild genes to the mix."

The University of Montana Wild Trout and Salmon

As part of its commitment to restoring unique cutthroat populations, FWP has created an experimental recovery hatchery program at Sekokoni Springs, east of Kalispell, where biologists soon will be developing nearest neighbor cutthroat stocks for recovery efforts in specific streams of the Upper Flathead River Drainage.

"This has lots of potential," Bertellotti says, "but we have to start off small. We can't do five streams at one time."

He explains that conserving specific populations is expensive. It also doesn't produce significant numbers of additional fish for people to catch.

In some at-risk cutthroat populations, not enough fish remain to provide donors that could be reared in hatcheries to help restore those streams. In these cases, Snyder says, one alternative would be to cross a few individuals from an at-risk population with fish from the existing westslope brood stock, and then stock the resulting offspring into a fishless stream. This would preserve the genes of the unique population along with the more diverse genetic makeup of the westslope stock. The approach has not yet been tried, Snyder adds, "but we're considering it as an alternative for conserving extremely reduced populations."

Much still yet to learn

Fisheries scientists continue working to improve the genetic quality of westslope brood stock and to understand how inbreeding alters fish health and fitness (see sidebar below). One major unknown is the significance of observed genetic differences among fish from different streams. Researchers don't yet know whether stream-to-stream gene differences reflect evolutionary adaptations or simply random changes due to small population sizes.

Because scientists have much to learn about trout genetics, the various unique westslope cutthroat populations are being conserved and restored whenever possible. In some waters, managers are removing nonnative fish such as brook trout from sections where they might compete with westslope cutthroat trout. And land management agencies are working to lessen environmental damage that threatens westslope cutthroat trout habitat.

Meanwhile, the westslope stock continues to be used mostly in mountain and valley floor lake waters, where it provides an excellent recreational fishery and superb food for a backcountry meal, yet is unlikely to mix with endemic cutthroat populations (which are mainly in streams). Managers maintain that keeping westslope cutthroat available for anglers' harvest and enjoyment is an important step in maintaining public support for cutthroat conservation.

What about the use of westslope hatchery stock to restore at-risk populations? FWP continues to improve the westslope hatchery stock and hold it available for use in recovery efforts where other options may not work. Fisheries managers, geneticists, and hatchery biologists continue to discuss when and where the westslope brood stock should be used to create new angling opportunities and to restore dwindling populations. But ultimately their common goal is to preserve the species that, on a June evening in 1805, Meriwether Lewis and his men cooked and ate—a species that Lewis afterwards proclaimed "a very fine trout." ■

Culture of improvement: Mark Sweeney with a netful of westslope cutthroat trout. "It's been an excellent-performing fish," he says.

MIKE GURNETT

stock

Genetics Lab advises FWP, and geneticists there continually examine different genes to monitor genetic characteristics of the brood stock. Robb Leary, a fish genetics expert at the University of Montana, documents the genetic makeup of fish using a starch-gel electrophoresis technique. He explains that genes carry the information for making a particular protein. Different genes or forms of genes produce different proteins, which can be sorted out by their different electrical charges. Leary looks at up to 60 genes to identify cutthroat stocks, or to track the genetics of a cutthroat stock over time.

Because a trout contains tens of thousands of genes, only a tiny portion of all its genes gets examined. But Leary notes that the 60 examined genes represent a random sample and thus provide information for comparison among westslope cutthroat populations.

A stream reborn: Before the restoration, this reach of Big Spring Creek was a 2,600-foot ditch that ran along State Highway 238 (above right). After crews excavated 20,000 cubic yards of sloppy muck from the old channel, lined it with gravel, and revegetated the banks, water was diverted into the restored reach, which now snakes back and forth along the original streambed (right).

Below: Brewery Flats in the early 1900s. The channelized stream reach and highway in the picture's lower lefthand corner are the same as that seen near the top left of the two color photographs.

MARK LERE

MARK LERE

the Resurrection *of* Brewery Flats

How local citizens and public agencies joined forces to restore a channelized section of Big Spring Creek

By Anne Tews and Mark Lere

THINK TROUT FISHING IN MONTANA and images of famous rivers such as the Madison, Bighorn, and Missouri quickly come to mind. More thought might conjure up the Yellowstone, Bitterroot, and Big Hole. Rarely imagined, however, is Big Spring Creek—a trout angler's secret hidden on the edge of the prairie in central Montana. Originating from the Madison limestone formation in the foothills of the Big Snowy Mountains, its 52-degree temperature and 50,000-gallon-per-minute flow provide ideal habitat for rainbow and brown trout. Up to 3,000 pounds of trout live in each mile of this productive stream. Big Spring Creek also is the lifeblood of Lewistown, an agricultural community where the locals boast of the city's pure, untreated drinking water, remarkable fishing, and nearby picturesque scenery.

PHOTOS COURTESY OF FERGUS COUNTY LIBRARY

Like many Montana communities, Lewistown was built on a floodplain, where the soil is fertile and the land is flat. More than a century ago, when the town began to flourish and grow along the banks of Big Spring Creek, developers rerouted a portion of the twisty, turning stream into straight channels and tunnels to make room for housing, transportation, and industry. An example of the stream's fate can still be found today in a downtown drinking establishment. A porthole through the floorboards of this bar gives patrons a chance for a fishy peep show, revealing Big Spring Creek under the floor as it tumbles down a dark tunnel beneath three city blocks.

Another channelized reach of the creek is located just upstream of town in an area known as Brewery Flats. Unlike the reach flowing underneath Lewistown, however, the Brewery Flats stretch has recently been given a new lease on life in a remarkable restoration that drew on the expertise and enthusiasm of everyone from local school children to government officials.

"You couldn't even fish from that bank without your backcast hooking a big pickup truck going by."

That was all soon to change. Leathe remembers the day in 1993 when he and Ted Hawn, of the federal Natural Resource and Conservation Service, first envisioned what the Brewery Flats reach might become.

"Ted had secured some federal funding for a stream restoration project," says Leathe, "so we were kind of road hunting for stream restoration projects around Lewistown." The pair knew that Brewery Flats was seldom fished because of the fast currents and the lack of holding water for trout. As they drove by, the unnatural, rock-lined channel paralleling the highway became an obvious candidate for restoration.

Natural stream channels are almost always sinuous. Their pattern evolves with the landscape and follows the laws of physics. A channel's curves and bends dissipate the energy of flowing water and efficiently move the silts and gravel transported by the stream. Meanders, or river bends, also are crucial in forming the pools and riffles typically found in natural channels, creating the environmental diversity necessary for healthy aquatic life.

Flash of a trout

Stop at the Brewery Flats Fishing Access Site (FAS) on Big Spring Creek today and you may hear the call of a song sparrow, see the flash of a trout in a clear deep pool, or glimpse a white-tailed deer slipping away through the underbrush. Yet for decades, this same stretch of river had been a major industrial site. At various times from the early 1900s to the mid-1980s, Brewery Flats was the site of a railroad yard, coal mine, oil refinery, feedlot, and, as the name indicates, a brewery. To make room for this development, the meanders of Big Spring Creek were straightened into a ditch that was routed off to the side, away from the development.

By 1985, when Montana Fish, Wildlife & Parks (FWP) purchased 23 acres of the Brewery Flats area to create a new fishing access site, the railroad was in bankruptcy and previous industries were just a memory. Nature had begun reclaiming the site with cattail marshes, cottonwood groves, and willow thickets. However, this process of re-naturalization could only go so far because the channel of Big Spring Creek remained confined to the straight ditch where it had been routed at the turn of the century.

"It wasn't much of a fishing area," says Steve Leathe, the regional fisheries manager at Great Falls. "The stream was right next to the highway, and you couldn't even fish from that bank without your backcast hooking a big pickup truck going by."

Years of hard work

Restoring meanders to the stream channel at Brewery Flats was neither easy nor cheap. A feasibility study conducted in 1995 raised a series of questions that needed to be resolved before any work could begin. Who would fund the project? Could the old city waterlines be abandoned to make room for meanders? Was the site contaminated with industrial waste? Could a newly constructed channel resist erosion? The vision Leathe and Hawn shared back in 1993 became a reality only with the help of

MARK LERE

Anne Tews is a fisheries biologist at Lewistown, and Mark Lere is the FWP Habitat Restoration Program officer at Helena.

MARK LERE

MARK LERE

Stuck in the muck: Tracked excavators (above) sometimes bogged down in the sticky ooze of Brewery Flats as crews dug out the new stream channel. Next, 5,000 cubic yards of gravel (far left) was placed in the new streambed to stabilize banks and create habitat for fish and aquatic insects. To further stabilize muddy banks, crews staked in a heavy fabric mesh (left) made of a biodegradable coconut fiber.

hundreds of people and several years of hard work. "It's amazing how the project came together," says Leathe.

Innovative partnerships and community cooperation were crucial in the eventual restoration. A coalition of local citizens, educators, civic groups, and government agencies—the Brewery Flats Planning and Development Committee—gathered information and community support for the restoration. Most of the $365,000 cost was drawn from the Federal Sport Fish Restoration Program, state license dollars from FWP's Future Fisheries Improvement Program (see sidebar below), and federal highway monies from the Montana Department of Transportation. Other partners included Fergus County, the Society of American Foresters, the Natural Resource and Conservation Service, and the Fergus County Conservation District. Additionally, volunteers from local schools and members of the Montana Conservation Corps contributed hundreds of hours of labor.

In 1998, with public funding secure and local support strong, FWP hired Inter-Fluve, Inc., a Bozeman-based private consulting firm, to design and oversee construction of the restored stream channel. The design called for re-establishing stream meanders that mimicked the natural form of Big Spring Creek. The new channel would meander 4,000 feet back and forth across the Brewery Flats FAS, creating a different environment from the straight 2,600-foot ditch where the stream had been flowing for at least 80 years. During construction of the new channel, Big Spring Creek would continue to flow down the near-century-old ditch channel, which ran parallel to the highway. The project was scheduled to be done in just six months, but a series of unforeseen obstacles stretched the construction out to more than two years.

Troubles begin

The first problem arose in late 1998, as Inter-Fluve staff members slopped their way through mud and standing water on Brewery Flats to stake out the meandering pattern of the new channel.

"Our crews were working in water over knee deep in places," says Dale Miller, a company principal. "We knew right away we'd have to bring in low-ground-pressure trucks when construction began." These specialized dump trucks—which move on large, tracked wheels similar to those of a military tank—were built for traversing marshy landscapes. Despite these difficult working conditions, crews were able to form the rough shape of the channel over a period of three weeks by excavating nearly 20,000 cubic yards of sloppy muck, which was stockpiled on-site to later fill the ditched channel.

Construction stalled again when crews realized that the new channel contained more mud than gravel. Streambed

DONALD M JONES

New residents. White-tailed deer and other wildlife now graze on Brewery Flats, where once stood an oil refinery, coal mine, railroad yard, feedlot, and brewery.

MARK LERE

FWP's Future Fisheries Improvement Program

The Brewery Flats restoration is just one of nearly 270 aquatic habitat improvement projects in Montana that have been funded by FWP's Future Fisheries Improvement Program (FFIP). Created by the 1995 Legislature, the program helps maintain the viability of Montana's wild and native fish species and preserve fishing opportunities for future generations. Most of the money comes from the sale of Montana fishing licenses. The 1999 Legislature added funds from the Resource Indemnity Trust Fund that are earmarked for the restoration of bull trout and cutthroat trout habitat.

Any individual or conservation group with a well-planned project that benefits wild fish or their habitat will be considered for funding. Applications for FFIP grants are simple, single-page forms. For applications and other information, check the FWP web site (fwp.state.mt.us) or call Mark Lere at (406) 444-2432.

gravel is important for stabilizing channels and providing essential habitat for trout and the aquatic insects they eat. As designers figured out how to add gravel to the new meandering channel, crews and their heavy equipment were moved off-site, leaving the restoration project a half-completed, muddy mess. After a full year of discussion and planning, crews returned to the site to deepen the mud-bottomed channel and spread nearly 5,000 cubic yards of imported gravel and cobble into the streambed.

To stabilize the muddy banks, crews staked a heavy fabric mesh made of biodegradable coconut fibers along the entire reach. After a few weeks of additional construction, the new channel appeared ready to receive the water of Big Spring Creek.

Another delay

Unfortunately, something besides water was missing. Large portions of the new channel lacked streamside vegetation due in part to unavoidable trampling by construction equipment. Streamside vegetation is the glue that prevents stream banks from eroding. Although it meant another year-long delay, project leaders decided that an entire growing season was needed to re-establish willows, sedges, and other important vegetation. To give the plants a jump start, volunteers and school kids scattered seeds and planted hundreds of shrubs and trees. The revegetation efforts proved successful, as lush vegetation sprouted from the stream banks the following year.

Finally, Brewery Flats was ready. In September 2000, more than two years after construction began, water from Big Spring Creek was slowly diverted into the new channel. As the flow of water gradually submerged the streambed cobbles and filled the new stream channel, nature's clock seemed to spin backwards—to a time before railroads and refineries, when Big Spring Creek last meandered freely across Brewery Flats.

As the old ditched channel began to gradually dry up, children from the local schools helped fisheries biologists rescue trout and other fish stranded in the shrinking pools.

"The kids actually helped carry buckets of trout from the old, dewatered channel over into the new channel," says Leathe. "It was great to see that kind of enthusiasm and interest by young people in a restoration project."

Today, water flows down a stream that is 50 percent longer than the abandoned, ditched channel, which was completely filled in with the dirt that was stockpiled from the initial excavation work. Calm, deep pools at each bend in the creek lure anglers, and emerging willow thickets and dense mats of native grasses now anchor the stream banks. Over time, streamside vegetation and nearby wetlands will rejuvenate with spring floods, as floodwaters deepen pools and wash silt from riffles to create healthy fish habitat. Natural flooding, so vital to the health of streams and their associated floodplains, could not occur when Big Spring Creek flowed straight down the old entrenched channel.

"The kids actually helped carry buckets of trout...over into the new channel....It was great to see that kind of enthusiasm and interest by young people in a restoration project."

In many ways, the new channel created at Brewery Flats resembles the creek that flowed there before the settlement of Lewistown. Some differences remain, however. Rainbow and brown trout have replaced the native cutthroat. And exotic ring-necked pheasants now flush from the tangles of cattail where 100 years ago only native birds would have sought shelter. Returning to the days when no one but the Assiniboine and Blackfeet camped along the stream is possible only with imagination.

The good new days

For sport anglers, however, these are the good new days at Brewery Flats. Rainbow and brown trout numbers already are more than 60 percent higher than the pre-project average, with roughly 700 trout 10 inches and longer making a home at the Brewery Flats FAS. Biologists expect the trout population to increase further as the new channel is scoured by floodwaters and more in-channel vegetation and woody debris accumulate, providing even more habitat for trout.

Anglers aren't the only visitors to the rejuvenated stream. A mile-long trail now winding through the FAS is popular for nature viewing and exercise, and local school teachers have adopted the 23-acre area as an outdoor classroom.

"I'd always heard about communities getting into a local project," says Leathe, "but I'd never experienced it on a large scale like this. The project really ignited local enthusiasm."

The Brewery Flats project has also encouraged local folks to start work on other sites. Community leaders are now focusing on revitalizing abandoned industrial areas next to the FAS with the hope of creating a public greenway throughout the Brewery Flats area. In addition, the community is exploring more-ambitious projects, including re-routing Big Spring Creek above ground through Lewistown and restoring natural meanders to about one mile of stream that was straightened years ago to make room for a mobile home park downstream of town.

If the Brewery Flats project is any indication, these future restoration projects will not be easy or cheap, but they will be well worth the effort. ■

Solving
of Fort

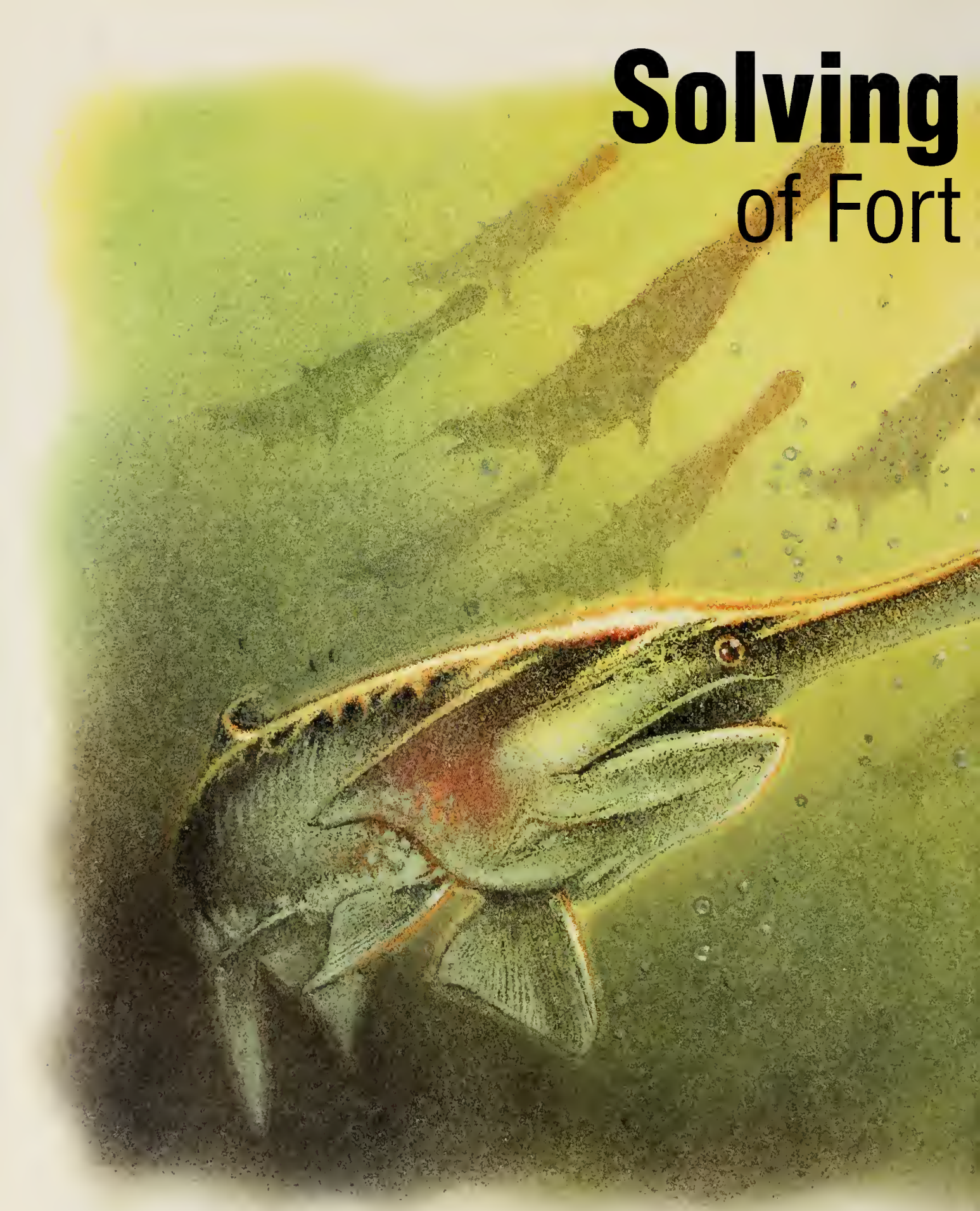


ILLUSTRATION BY RON FINGER

the puzzle

Peck's young paddlefish

By Joe Kozfkay, Dennis Scarnecchia, Kent Gilge, and Bill Wiedenheft

Because young paddlefish are so elusive, biologists couldn't monitor these fish—until now

When anglers discuss big fish, the talk usually turns to trout, walleye, and northern pike. It really should turn to paddlefish. Although Montana's record brown trout weighed 29 pounds, walleye 16.63 pounds, and northern 37.5 pounds, the biggest paddlefish weighed more than three times the largest of those fish. And paddlefish are more than just big. Paddlefish fossils dating back 60 million years or more have been found near present-day Fort Peck Reservoir, making this prehistoric remnant one of Montana's oldest fish species.

Today, the paddlefish is found in the mainstem Missouri River (above and below Fort Peck Dam), the lower Milk River, and the lower Yellowstone River from Forsyth to the eastern border. The completion of Fort Peck Dam in the 1930s resulted in the separation of Montana's paddlefish into two stocks: one from below Fort Peck Dam eastward (downriver) into the Missouri and Yellowstone rivers, and the other from Fort Peck Dam westward (upriver) into the upper Missouri River.

Historically the latter stock, known as the Fort Peck stock, has had the largest fish. The Montana record, caught

in 1973, weighed 142.5 pounds.

Because paddlefish eat only microscopic zooplankton—which they filter from water with comb-like rakers near their gills—these fish are almost never caught by hook and line. Rather, anglers at popular fishing sites such as the Fred Robinson Bridge (U.S. Highway 191) use weighted treble hooks and stout line to snag the fish and haul them in. A typical year's total harvest from the Fort Peck stock is several hundred fish. These large, sexually mature (adult) fish are caught while migrating upstream into the Missouri River to spawn from their feeding grounds in the reservoir.

To ensure that anglers don't overfish the paddlefish population, Montana Fish, Wildlife & Parks (FWP) biologists monitor paddlefish to see how the population is faring from year to year. Biologists attach small tags to migrating adult fish and then monitor the harvest rates of tagged fish, which anglers are urged to report. In addition, creel clerks ask anglers about the length and weight of fish caught, which provides information on the size structure of the paddlefish population. Biologists also estimate the age of harvested fish by collecting lower jaw bones (known as dentaries) and counting annual rings on cross sections of those bones (similar to how harvested trees are aged).

Although anglers naturally focus on the large adult fish, fishery managers must also pay attention to the fish anglers seldom see: small, young, immature paddlefish feeding in Fort Peck Reservoir. Only by monitoring young paddlefish numbers each year can managers know if adult paddlefish are successfully reproducing. For example, if spawning success or survival of several generations of young paddlefish (called year classes) declines, adult fish monitoring would not detect the problem until many years later, when those fish had reached spawning size and were susceptible to snagging. But by then it might be too late to reduce harvest or to learn why those year classes had done poorly.

Only mature paddlefish migrate to spawning areas and get harvested, so traditional monitoring techniques supply information only on the status of the adults. Because the young paddlefish are too elusive to find and count, biologists at Fort Peck have been unable to solve the mystery of their population status. Until now.

Foiled by their rostrum

For more than a century, scientists nationwide have tried to learn about wild young-of-the-year paddlefish (those that were hatched earlier in a year). Most efforts end in failure. A breakthrough came in the early 1990s in Lake Sakakawea, the Missouri River mainstem reservoir in North Dakota, downstream from Fort Peck. Biologists and anglers there noticed that when young (but at least five-inch-long) paddlefish feeding near the surface were approached by a slow-moving motorboat, the fish stayed at the surface.

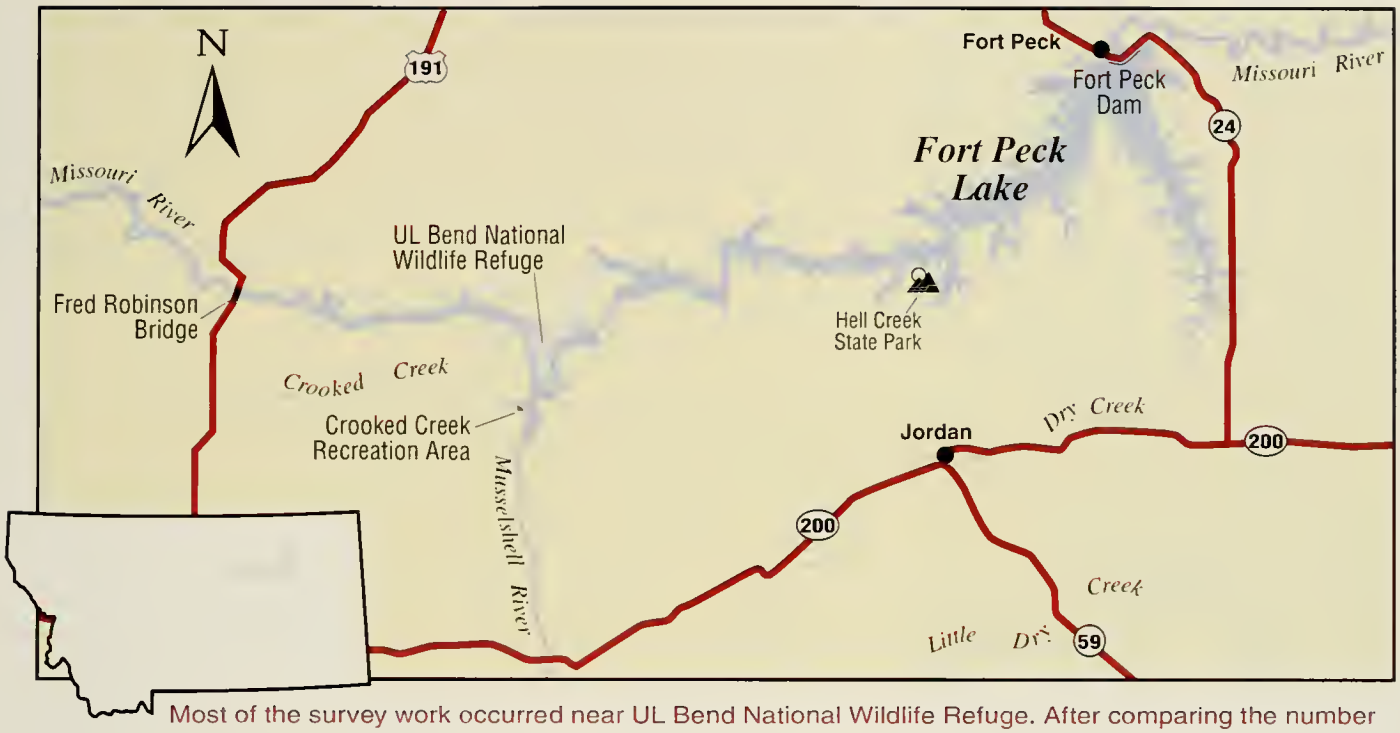
Most fish species can flee danger from above by diving quickly, but a paddlefish is different. At the front of its head is a long, paddle-shaped structure called a rostrum. An adult fish uses its rostrum to sense zooplankton, which it then consumes by swimming open-mouthed through schools of the tiny organisms. What the paddle also does, when the fish swims quickly, is to act like an airplane wing and force the paddlefish up instead of down. Biologists found that when young paddlefish rushed to escape an approaching boat, their anatomy propelled them to the surface where they could be counted or captured with long-handled dip nets.

Suddenly, fisheries biologists at Lake Sakakawea had a tool for assessing reproductive success, growth rates, and year-class strength of paddlefish. The big question for Fort Peck paddlefish biologists, however, was whether the method would work in their reservoir.

First attempts were promising. In 1995, biologists from FWP and the University of Idaho used the boat-chase

PHOTOS BY FRED RYCKMAN

When a young paddlefish (above) tries to flee an approaching boat, its paddle (rostrum) acts as a wing and forces the fish to the surface, where it can be netted by biologists (right).



Most of the survey work occurred near UL Bend National Wildlife Refuge. After comparing the number of young paddlefish each summer to the Missouri River's spring flow, scientists now suspect that more paddlefish are produced in years when the river runs high and turbid.

method to count more than 40 young paddlefish and capture nine fish in the area west of the UL Bend National Wildlife Refuge. Then, two years later, biologists counted more than 250 young-of-the-year paddlefish in one afternoon in the same area.

Why were so many more fish located in 1997? Biologists suspect that it indicated more young fish that year, due to spring river conditions that had allowed successful paddlefish spawning. In other words, the 1997 year class appeared to be stronger than the 1995 year class. However, biologists didn't have enough information to be sure of this hypothesis, so they decided to intensify their search for young paddlefish during the next two years.

In 1998, the search for young-of-the-year and yearling fish (those hatched the previous year, which have grown up to 16 inches long) began in mid-July along transects (standardized straight line routes) across the upper reservoir. After two weeks of extensive searching, the fisheries biologists finally located five- to seven-inch young-of-the-year paddlefish near Beauchamp Creek, 12 miles upstream of the Crooked Creek Recreation Area. By August, counts increased slightly as young-of-the-year fish moved down-reservoir (east) to near Crooked Creek, where waters were clearer and zooplankton were more abundant. By the end of September, counts had decreased as the fish dispersed to unknown wintering areas. When they finished the year's search, biologists had counted just 97 young-of-the-year fish along the transects, considerably fewer than in the previous year.

The flow factor

Biologists can't explain conclusively the reasons for yearly differences in young paddlefish numbers at Fort Peck, but they suspect that flow conditions are an important factor. In an average year in the area of the Missouri where the Fort Peck population spawns, high flows of over 14,000 cubic feet per second (cfs) are exceeded for 47 days, from May 18 to July 3. In 1997, the year observers saw many young paddlers, the Missouri River exceeded these flows and was exceptionally turbid for 65 days, from May 2 to July 5, much longer and higher than average. During 1998, however, when far fewer young paddlefish were spotted, flows of 14,000 cfs were exceeded for just 31 days, from June 18 to July 19. That year, the high flows came approximately one month later and lasted two weeks less than in an average year.

The pattern held in 1999. That spring, the 14,000 cfs discharge was first exceeded on June 3 and remained above this level for only 13 days, until June 15. Biologists expected to find few young paddlefish after that. Beginning in mid-July, they sampled the same transects as in 1998, and young-of-the-year fish were nowhere to be found. In all, they counted only three young-of-the-year paddlefish during July, August, and September of 1999.

Based on the results of preliminary studies in Fort Peck, and more extensive studies in Lake Sakakawea, it appears that greater reproductive suc-

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Joe Kozfkay is a graduate research assistant and Dennis Scarnecchia is a professor of fisheries at the University of Idaho, Moscow. Kent Gilge is an FWP fisheries biologist and Bill Wiedenheft is FWP's regional fisheries manager at Glasgow.

cess of paddlefish is directly linked to higher river discharge in spring. When the river ran high and turbid, more young paddlefish were produced; when the river ran low and clear, few young paddlefish were produced.

FWP is continuing this research until scientists can better understand the relationship between spring spawning conditions and paddlefish reproduction success and year-class strength. Most important is learning if a critical amount of flow in spring is necessary to provide successful reproduction, and whether reservoir levels also influence early survival of paddlefish. Biologists are now hoping for several years of high spring flows and high reservoir levels to compare to recent years of low flows and low reservoir levels.

Paddlefish food

In addition to reproductive success, biologists also aim to learn more about the diet of young paddlefish. The food that fish eat affects their growth rate, survival, and year-class strength. In contrast to larger paddlefish, which feed by swimming with their mouth wide open and filtering zooplankton and other small invertebrates from the water, young-of-the-year paddlefish actively search out and pick individual prey from the water. Although the diet of adult paddlefish is well known, the diet of wild young-of-the-year paddlefish has remained largely a mystery, because the fish have been so infrequently captured for examination.

Once again, the "scare-'em-to-the-surface" monitoring technique paid off. After netting young-of-the-year and yearling paddlefish, biologists examined the stomach contents of the fish. They found that fish from turbid, more river-like habitats contained mostly chironomid larvae (blood worms) and immature mayflies. Stomachs of paddlefish that had moved into clearer, more lake-like habitats (which supported higher densities of zooplankton) contained mostly one species of zooplankton, *Leptodora kindtii*.

A relatively large, slow-moving zooplankton, *Leptodora* exists in low densities because it is a preferred food of many fish species. In the lake-like reaches of Fort Peck, this zooplankton species comprises less than 1 percent of the zooplankton organisms in the water. Yet stomachs from most young paddlefish sampled from these waters contained more than half, and sometimes only, *Leptodora*.

Not only did the young paddlefish of Fort Peck Lake select the largest zooplankton species available, they selected the largest individuals of *Leptodora*. The lengths of individual *Leptodora* in the stomachs of young paddlefish were nearly double those of the average *Leptodora* available in the water. Clearly the young paddlefish have a favorite food, and the larger the better.

Obtaining enough of this favorite food for rapid growth may be critical to the survival of these young fish. The faster young paddlefish grow, the sooner they reach sizes too large to be eaten by fish or birds. Estimated growth rates of young paddlefish roughly six inches long approached 0.4 inches in 10 days, a rapid rate compared to that of other young fish species. If small paddlefish can't get enough *Leptodora*, they may remain vulnerable to predators for a longer period of time. So there may be a connection between the abundance of *Leptodora* in a given year and the strength of that year's generation of paddlefish, or year class.

Because of the importance of *Leptodora* as food for young-of-the-year paddlefish, scientists continue to study this zooplankton in the upper reservoir.

Biologists made other discoveries as

Although their understanding of the paddlefish in Fort Peck is far from complete, biologists now know that reproductive success varies greatly among years, and that the difference could be a result of the species' specific requirements for spawning.

they picked through the stomach contents of small paddlefish. As they had with young-of-the-year paddlers, biologists found that yearling paddlefish also had selected individual aquatic insect larvae or *Leptodora* from the water. The yearlings, which were usually over nine inches long, had not yet begun filtering zooplankton with their gill rakers. The only filtering fish was a single two-year-old caught during the study. Biologists knew this because it was the only fish to have large numbers of common smaller zooplankton in its stomach and to contain different zooplankton species more in proportion to the natural abundance of the invertebrates in the reservoir.

Although their understanding of the paddlefish in Fort Peck is far from complete, biologists now know that reproductive success varies greatly among years, and that the difference could be a result of the species' specific requirements for spawning. They also know that the paddlefish is a picky eater during the critical first year of its life. Such information aids in biologists' ability to conserve this native species, which is not only a valuable recreational fish but also an important part of Montana's natural heritage. ■

JIM LIEBELT

KONRAD SCHMIDT

Scientists can gather information on adult paddlefish (above), because the large fish can be caught by snagging. However, until recently, scientists could only study young paddlefish reared in aquariums. The eight-week-old paddlefish pictured here has a blunted rostrum from repeatedly bumping it into the glass side of the aquarium.

Montana Outdoors Report

Dickson takes the reins of *Montana Outdoors*

Tom Dickson, previously of St. Paul, Minnesota, has been hired as the new editor of *Montana Outdoors*, the bimonthly magazine published by Montana Fish, Wildlife & Parks.

Dickson, 42, takes the magazine's helm after working 14 years for the Minnesota Department of Natural Resources. He edited a bimonthly webzine, *Fish and Wildlife Today*, wrote frequently for the department's magazine, and managed communications for the agency's Wildlife, Fisheries, and Ecological Services divisions.

STEVE MERCHANT

Dickson and Gracie with a rainbow trout: "I'll be listening a lot to what people have to say over the next few months," the new *Montana Outdoors* editor says.

A hunter, angler, cyclist, cross-country skier, and bird-watcher, Dickson considers himself an "amateur all-arounder" when it comes to outdoors activities. "There's just so much to do outdoors that I've never been able to focus on just one thing and get good at it," he says. "October is particularly hard on me."

Ron Aasheim, administrator of the FWP Conservation Education Division, says the agency conducted a nationwide search to replace Dave Books, who retired in December 2001, after 24 years as magazine editor.

"We had some big shoes to fill, so we went all out to recruit the best candidate we could find," Aasheim says. "From the get-go, we knew Tom had the experience, expertise, and enthusiasm we wanted in a new editor."

After earning a degree in English at the University of Minnesota, Dickson edited hunting and fishing magazines at a Minneapolis-based publishing company. In 1987, he began work for the Minnesota DNR, where he specialized in writing about contentious natural resources issues such as predator control, fish stocking, and agency funding.

Dickson, who also co-authored an angling book titled *Fishing for Buffalo*, has won eight first-place writing and editing awards from the International Association for Conservation.

The new editor says he will survey readers and meet with agency staff and representatives of major conservation groups to get a sense of what the magazine does best and where it might be improved further.

"I'll be listening a lot to what people have to say over the next few months."

No challenge for these 20 winners

They knew which species of duck nests in tree cavities (wood duck), how many trout FWP stocks each year (10 million), the name of Montana's first state park (Lewis and Clark Caverns), and the answers to 19 other questions posed in the first Montana Outdoors Challenge.

The contest measured readers' knowledge of Montana fauna and flora as well as fish and wildlife management. Of the hundreds of entrants that correctly answered all 22 questions, we randomly selected 20 for prizes. Names and prizes are listed below:

1. Chris Ellsworth, Liberty Lake, Washington (binoculars)
2. Matt Seidel, Missoula (rod and reel)
3. John Laverly, Burlington, Vermont (sleeping bag)
4. Jeff Hickethier, Spokane, Washington (state parks pass)
5. Larry McMillin, Slippery Rock, Pennsylvania (state parks pass)
6. Jim Mountjoy, Winthrop, Washington (state parks pass)
7. Kevin Hawkins, Billings (state parks pass)
8. Mark Laslovich, Missoula (state parks pass)
9. Odim Neckstad, Augusta (FWP T-shirt)
10. Dean Seifert, Miles City (FWP T-shirt)
11. Sean Cross, Ronan (FWP T-shirt)
12. Delbert Hartford, Alder (FWP T-shirt)
13. Merlyn Gunsch, Lewistown (FWP video)
14. Charles Helman, Port Hadlock, Washington (FWP video)
15. Roy Fansler, Fairfield (FWP video)
16. George Johnson, Kalispell (FWP video)
17. Tom Bergsland, Bozeman (*Montana Outdoors* subscription)
18. Tim Aman, Bozeman (*Montana Outdoors* subscription)
19. Ed Hollandsworth, Elliston (*Montana Outdoors* subscription)
20. Abby Raths, Roundup (*Montana Outdoors* subscription)

Congratulations to all winners and thanks to everyone who entered. Look for additional contests in future issues of *Montana Outdoors*.

Dickson says. "Already I'm learning that there is interest in us running more articles on issues related to the social implications of fish and wildlife management, such as hunting and fishing access issues and endangered species management."

His wife, Lisa Myaya, previously worked for the Science Museum of Minnesota. The couple owns a golden retriever, Gracie.

Public asked to comment on wolves

DUSAN SMETANA

FWP wants to know how people think it should manage Montana's wolves if the state were to regain management authority.

A document suggesting how Montana could manage gray wolves is now available for public review and comment. In January 2002, FWP released the draft "Montana Wolf Conservation and Management Planning Document," which is based on recommendations made by an advisory council representing livestock producers, conservationists, hunters, educators, and other interests.

Beginning in March, the agency will host meetings to begin a nine-month process of drafting an environmental impact statement required before the state can produce a final management plan.

The document now available for review addresses human safety, wolf conservation, livestock predation, wolf management, funding, and maintaining Montana's deer, elk, and moose populations.

According to Glenn Erickson, chief of the FWP Wildlife Management Bureau, the document is not the state's official wolf management plan, but it does "reflect what a state wolf plan could resemble if it were based on the council's recommendations," he says. "Now we need to hear from other people so we can be sure all concerns are voiced."

Erickson adds that the planning document provides a base of information from which citizens can identify ways the state can best manage wolves if the animals were removed from the federal Endangered Species List.

Biologists estimate that roughly 570 wolves now live in the Montana, Idaho, and Wyoming recovery area. Approximately 100 wolves are in Montana. Before the U.S. Fish and Wildlife Service will consider removing the wolf from the list and transferring management authority to the state, all three states must have a management plan that ensures viable wolf populations in the northern Rocky Mountain Recovery Area. A final plan could be completed as soon as November 2002.

Among the recommendations or guiding principles in the draft planning document:

- Wolves are a native wildlife species and a part of Montana's natural environment and heritage.
- Montana is committed to maintaining a recovered wolf population and to preventing wolves from being reclassified as threatened or endangered under federal law.
- Wolves should be managed similarly to the way mountain lions are: based on sound ecological principles, allowing for public taking when the population reaches a level where it can biologically sustain a regulated harvest.
- Landowners and livestock owners should be able to shoot wolves they see harassing livestock, just as they can other large predators that are under state management.

To review and comment on the planning document or find the dates, times, and locations of public meetings, call FWP at (406) 444-2612 or go to the agency's web site: www.fwp.state.mt.us/wildlife/wolf/wolfmanagement.asp

Bear hunters take test in droves

Bear hunters appear eager to prove they know a black bear from a grizzly. As of early February, more than 7,500 people had passed a new bear identification test now required by Montana FWP before issuing a bear license.

The requirement began with the 2002 spring bear season to ensure that grizzly bears aren't inadvertently killed by black bear hunters. Approximately one or two of the federally protected grizzlies are shot each year by black bear hunters.

Because the two species can have a similar appearance, the test was created to teach bear hunters ways to distinguish grizzlies from black bears in the field.

The test consists of 15 multiple-choice questions and a training program. Applicants may retake the test until they obtain a passing grade of 80 percent.

"Hunters have been real supportive of this measure, because they are real supportive of grizzly conservation," says Thomas Baumeister, FWP hunter education coordinator. "If the test will prevent even one grizzly from being killed, it will be worthwhile."

The test teaches hunters to distinguish a black bear (shown here) from a grizzly.

The test is available on-line at FWP's web site at fwp.state.mt.us. (click on the bear image to open the test), or by requesting it by mail from the department at Montana Fish, Wildlife & Parks, Bear Test, 1420 East Sixth Avenue, P.O. Box 200701, Helena, MT 59620-0701. Tests are also available at any FWP office or license agent.

A better license

Recently, a 100-year-old tradition of writing or typing information on Montana hunting and fishing licenses came to an end. On March 1, 2002, Montana FWP began using a new Automated Licensing System (ALS) to dispense licenses. Previously, the state's hunting and fishing licenses were written out or typed by license agents, who then stored copies and shipped carbon copies and fees to FWP.

The new electronic technology will streamline the process and improve service to resident and nonresident hunters, anglers, and state park visitors, say FWP officials. (Nonresident big game combination licenses, however, will continue to be handled the traditional way.)

"ALS will make licensing faster and more efficient," says Jeff Hagener, FWP director. "Of course, during the first few months it will take some time for customers and agents to get the hang of the new system, but after that, license purchases should get real routine."

Hagener says that because license buyers are so accustomed to the look and feel of the old licenses that the new licenses will take some getting used to.

Perhaps the least familiar aspect of the new system is that many licenses can be listed on a single plastic-coated document, similar in size to a cash register receipt. For example, someone who buys a fishing license and an upland bird license will receive, at the time of purchase, just one document on which both licenses are listed.

Licenses that must be used to legally tag a harvested animal—such as an elk or deer license—will be printed out separately on a single sheet and enclosed in a pouch supplied by the license vendor.

"ALS will make licensing faster and more efficient."

—Jeff Hagener, FWP director

In addition to providing licenses faster than the old system, ALS offers several other benefits:

- The system offers "one-stop-shopping" by which many licenses can be purchased in one simple transaction at any of the 400 license provider locations statewide.
- A lost license can be easily replaced at any license agent for a small service charge.
- The ALS database will provide information to FWP about license buyers, allowing the agency to survey hunters, anglers, and park users to improve customer satisfaction.

New fishing regs worth noting

Beginning March 1, Montana's 2002–03 fishing regulations took effect. Among the more important changes:

Sauger and walleye: On waters where the sauger harvest is limited to one fish (Missouri River above Fort Peck Reservoir, Fort Peck Reservoir, and the Yellowstone River between Billings and Forsyth), anglers must keep all sauger and walleye whole (gills and entrails may be removed) while they are on the water so that game wardens can identify the species. Sauger and walleye may be filleted when anglers are off the water and finished fishing for the day.

Canyon Ferry Reservoir will have a daily walleye limit of 20 (only one may be over 28 inches) and a possession limit of 40.

Rainbow and brown trout: The Missouri River from Holter Dam to the Dearborn River will have a daily limit of one brown trout (22-inch minimum size) and one rainbow trout (any size).

Due to the effects of drought on trout populations, bag limits have been reduced to three trout daily (only one over 18 inches) on the Beaverhead River (from Clark Canyon Dam to Anderson Lane), the Jefferson River upstream from Willow Creek, and the Red Rock River (Lima Dam to Clark Canyon Reservoir). The Jefferson River will remain catch-and-release for rainbow trout, and the Beaverhead River will continue to have a rainbow trout limit of one.

Warmwater fish: New waters requiring a Warmwater Game Fish Stamp include Fort Peck Dredge Cut Pond (Valley County), Wapiti Reservoir (Phillips County), and Warm Springs Creek (Fergus County).

Tongue River Reservoir will have a crappie limit of 30 daily and 60 in possession. ■

MONTANA FISH, WILDLIFE & PARKS FOUNDATION

The Montana Fish, Wildlife & Parks Foundation raises funds to provide critical private support for FWP in its stewardship of the fish, wildlife, parks, and recreational resources of Montana. The foundation accepts individual and corporate gifts and assists in designing planned gifts to fit individual needs.
For more information visit the foundation web site at *http://fwp.state.mt.us/foundation*
or e-mail at *fwpfoundation@state.mt.us.*
You may also call or write
406-444-6759
MFWPF
1420 East Sixth Avenue
PO Box 200701
Helena, MT 59620-0701

The truth hurts

By Chris Ralph

One of the interesting dilemmas we game wardens face is that sometimes people will resort to deceit to get out of a situation they find themselves in. I don't believe these people really want to lie to law enforcement officers; it's just something they can't help but do.

I've heard them all: "My dog ate my fishing license, officer"; "I don't know how that deer got in my truck, officer"; "But officer, you mean to say the season hasn't opened yet?"

Usually these partial truths are pretty obvious. But sometimes, it's not the lie that gives people away. It's their kids.

A few years ago my wife and I had our first baby. The event changed my life, and naturally I began paying more attention to kids I'd encounter while working. One thing I noticed right away is that kids usually tell the truth. And that honesty sometimes gets them—or their parents—in trouble.

One time I was giving a presentation on bears at the local school. My wife, Chris, a second grade teacher, often asks me to bring in something to show her kids. After my presentation, I was out in the hall talking with Chris when the bell rang and kids poured out of their classrooms. A young boy ran up to me and hugged my legs. Chris, who recognized him, asked, "Leroy, do you know Mr. Ralph?" "Yes," the boy replied. "He came to my house yesterday and took my dad's deer!"

After I patted Leroy on the head and smiled, he ran off happily, clueless as to what he'd just said. All he knew was that I was a nice guy who came by to visit his house. We still chuckle about the boy who hugged the warden who took his dad's deer.

Another time a friend and I went canoe patrolling down the Kootenai River. We launched below Libby Dam and headed toward the boat ramp at Libby, where we planned to pull out.

It was a usual busy summer day, with lots of anglers and lots of boats. After about an hour, I spotted some people fishing from shore and decided to check them out. We pulled the canoe up and got out.

As I greeted the anglers—two men and a woman—I noticed that with them was a small boy around four years old. I told them who I was and that I was checking fishing licenses and fish.

The adults were acting nervous as they showed me their licenses. Not the boy, however. He was quiet, but not shy, and stood next to me looking up intently as I talked to the adults.

I asked if they were aware that anglers had to release all trout between 13 and 18 inches, and they said they knew about the regulation. Then I asked to look at any fish they might have kept. The boy's father said they didn't have any—that they'd caught a small fish earlier but had released it.

The boy stepped forward. "We threw the small fish back," he said earnestly, "but my daddy has a bigger one in that bag." He pointed to a lunch sack partially hidden behind a rock.

It was all I could do to not smile. The dad dropped his head and nodded ashamedly that a trout was in the bag and that I could look at it. The fish was an illegal size, so I gave him a ticket, took the fish, and said goodbye.

As my friend and I paddled away, we agreed that, in all likelihood, the boy would not be rewarded that day for his truthfulness. ■

Chris Ralph is an FWP game warden in Libby.

Letters

Ourmistake

Having been born and reared in Big Timber, I get upset when I see Sweet Grass County spelled as one word: Sweetgrass. This you did on page 29 of the issue (Jan./Feb.) that arrived today. Let's hope this never happens again in your otherwise charming magazine.

L.M. Baskett, M.D.
Livingston

Editor's reply: *You are correct. Another Sweet Grass is the town Port of Sweet Grass, on the Canadian border.*

Hay there

We vacation in Montana and are ardent readers of *Montana Outdoors*. On page 17 of the Nov./Dec. issue, I noticed a photo of a haying operation. Could you tell us what that contraption is and how it is used?

Jane T. Perna
Chesterfield, Missouri

MIKE LOGAN

Editor's reply: *According to Mike Logan, cowboy poet and author of the book* Ranchin' Is..., *the device is a beaverslide. Traditionally made of lodgepole, beaverslides were commonly used in the early part of the 20th century to put up loose hay. Cut hay was raked to the beaverslide and piled on a platform. A system of ropes and pulleys allowed horses, and later tractors, to raise the platform along diagonal supporting poles to the top of the beaverslide, where the hay was tipped onto the growing pile, enclosed within a wood frame. A few beaverslides are still used in western Montana, says Logan, but these days most hay is baled with mechanical balers.*

Why no whitetails?

Last fall I hunted deer in eastern Montana in Area 651. We saw plenty of mule deer but not many whitetails. What happened to the whitetails?

James W. Fackler
New Hope, Minnesota

Harold Wentland, FWP wildlife manager at Glasgow, replies: *It depends on where in 651 you were hunting. The winter of 2000-01 was hard on whitetails near the North Dakota border. Ice crusted the snow and made it hard for whitetails to find food. Mulies survive better in those conditions because they don't depend so much on farm fields for food and can find browse in canyons.*

If you were hunting farther west in 651, then epizootic hemorrhagic disease (EHD) was the culprit. Transmitted by biting midges, the virus afflicts whitetails but usually not mule deer. The virus was pretty bad in the area from Havre east to Saco last year, but not so bad east of Saco.

Down's not a barrier

It is uplifting to see articles like the one on Charlie Stafford ("Making His Mark," Sept./Oct.) that focus on the abilities of differently abled people. We have a seven-year-old son with Down's Syndrome who enjoys the outdoors. He is too young to hunt, but he loves to fish, camp, and walk in the woods.

Donna Creed
Blackstock, South Carolina

More concerned about conservation

I enjoyed immensely your article about Bruce Neal ("A Sun River Legend," Nov./Dec. 01). Mr. Neal believed as I do that wildlife is here for all of us to enjoy. Though I hunt elk, I am not really as concerned about killing game as much as I am about conserving and protecting wildlife and mountains.

William H. Link, Sr.
Shanks, West Virginia

Ask FWP

Q.: *We often see a gray-colored raptor with black wing tips and a white rump patch flying low across our farm fields. My husband says it's a marsh hawk. I say it's a northern harrier. Who's right?*

A.: You both are, but you are more up-to-date than your husband.

This common Montana bird, which often cruises with upturned wings over marshes, pastures, and grasslands, is a northern harrier. For years it was called a marsh hawk, but the name was changed in the late 1970s by the American Ornithological Union to be consistent with the name used for this same species in other parts of the world.

That was also when the name pigeon hawk was changed to merlin, and sparrow hawk was changed to kestrel.

We welcome your comments and letters to the editor. We'll edit letters as needed for accuracy, style, and length. Send your letter and a daytime phone number to: Montana Outdoors, 930 West Custer Avenue, P.O. Box 200701, Helena, MT 59620-0701. E-mail: tdickson@state.mt.us.

Montana Outdoors PROFILE

Sandhill Crane

(Grus canadensis)

By Tom Dickson

JOHN R. FORD

Revered in Asia for their elegance and beauty, cranes have a small but growing following in North America.

Dignified and stately in flight, the sandhill crane also moves on land with grace and agility. Most spectacular is the bird's mating dance, in which two cranes bow, leap, hop, skip, and pirouette like avian ballet dancers. A nervous bird with spotting-scope eyesight, the crane prefers open areas where it can keep watch for coyotes, its primary predator.

The sandhill is in the same family as the whooping crane, today one of the world's rarest birds.

Appearance: Sandhill cranes are big wading birds with long legs, a long neck, and a rapier-shaped bill. They stand four feet tall and can stretch their wings out six feet wide from tip to tip. These slender birds are mostly gray except for the forehead, which is bright red, and their black legs and bill. They weigh seven to eight pounds.

Sound: There's no mistaking the call of the sandhill crane. There's also no way to accurately describe it. Sandhills makes a loud, rolling, musical rattle that can be heard from more than a mile away. One nature writer compares it to the sound of "fingernails drawn along the teeth of several combs," undulating up and down and amplified by the birds' exceptionally long windpipe.

Food: Omnivores, cranes will eat anything from berries and grains to snakes and amphibians. Even mice, voles, and other small mammals are sometimes found in the stomachs of sandhill cranes.

Reproduction: The crane nest is usually a simple affair consisting of a shallow depression in soil lined with dry grass and feathers. The female lays two spotted, gray-brown eggs. Both parents incubate the eggs by trading places throughout the day. The eggs hatch in 30 days. Because the sandhill crane produces relatively few young and doesn't begin breeding until age eight, it takes a long time for populations to recover from a drop in numbers.

Habitat: Generally, sandhill cranes seek out wet areas where they can find food and avoid predators. In Montana, sandhills nest in wet meadows and other wetlands and near streams and beaver ponds.

Status and management in Montana: Sandhills are counted each September in western Montana before the birds migrate south. This and similar surveys in Idaho, Utah, and Wyoming indicate that the Rocky Mountain population contains roughly 20,000 cranes. The breeding range of the Rocky Mountain population had dropped to 150 to 200 breeding pairs in the 1940s due to unregulated hunting.

Now enough sandhill cranes nest in and migrate through Montana to allow a regulated hunting season on the birds each fall. Roughly 500 hunters receive permits each year. The cranes are hunted by placing decoys in feeding fields, similar to a technique used to hunt geese.

Where to see them: Sandhill cranes are a common sight in eastern Montana during the fall migration. Skeins of migrating birds pass overhead throughout the region in October, enjoyed by photographers, hunters, and wildlife watchers.

In western Montana, one of the top spots for viewing cranes up close is the Red Rock Lakes National Wildlife Refuge in southeastern Beaverhead County, 50 miles west of Yellowstone National Park. In April, the birds arrive from their wintering grounds in southern New Mexico, and they stay until heading south in September. Look for cranes along creeks, wetlands, and open grassy areas. Get more information by calling (406) 276-3536 or on-line at www.gorp.com/gorp/resources/us_nwr/mt_redro.htm (Note: this is a commercial web site. The wildlife refuge's official site was inaccessible when this issue went to press). ■

Tom Dickson is editor of Montana Outdoors.

An angler ties into a westslope cutthroat trout on a high-mountain lake in the Bob Marshall Wilderness. What role do hatcheries play in restoring this native fish species? See page 14. Photograph by Conrad Rowe.

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